The Builder.

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The Fourth Centenary of the Birth of Michelangelo.

THE beautiful city of Florence put on her most brilliant attire, and aided by perfect weather and its lovely sky, invited her citizens and the strangers who had come from far and near for the occasion to do honour to the memory of her most celebrated artist. These fêtes should have been held on the 6th of March, the birthday of Michelangelo, but circumstances obliged the postponement till the 12th and two following days of this month.

On the 12th was given a concert in the hall of the Cinque Cento, in the Palazzo Vecchio, at which the most appropriate production was that of one of the madrigals of Michelangelo, set to music by one Rampazato in 1565, and well sung by female choristers. At three o'clock a procession left the Piazza della Signoria, consisting of representatives of all the trade associations in Florence, carrying their respective banners; of the literary societies, representatives of the art societies and literary men from foreign countries; of the press, the Prince di Carignano, relative of the king; a crowd of military officers; the Prefect Ubaldino Peruzzi; the Syndic of Florence; and a regiment of infantry. Accompanied by twelve bands, the procession passed to the Via Ghibellina. Over the entrance-door of the house of the artist had been placed his bust in bronze, the work of the lamented Papi, and the gift of the owner of the bronze foundry, Sig. Galli. This was uncovered at the approach of General Denza, representing the king, and by whose side walked the last male representative of the Buonarotti family,—a young military volunteer. Each flag was lowered as the procession passed the bust to do honour to the great artist. From the portal, Allardi, the poet, delivered an address, received with enthusiasm by those who heard it. The part of Via Ghibellina where stands the old palace of the Buonarotti being narrow, the number of hearers was small.

The procession next started to gain the church of Santa Croce, where is the tomb of Michelangelo. At the foot of the tomb was a beautiful wreath of laurel, encircling a Latin inscription sent by the artists of Stutgard. Before the tomb stood a low column of black marble 2 ft. in diameter, round which hung a magnificent wreath of silver oak-leaves and shining berries, the hanging branches tied at intervals with a silver riband, on which was engraved the name of the town and society contributing to the wreath. Under each leaf was graven the name of the artist donor. The garland, of perhaps 300 leaves or more, is fastened by a gold clasp, on which is graven that the wreath is the gift of the artists of Germany. Grouped round the tomb, the representatives, the literary visitors, the officers, &c., the Count Pelli Fabbroni, the "Conservatore" of Santa Croce, addressed a few words to those assembled,—"Your eyes can rest," he said, "your hearts beat, on the sepulchre of the divine artist and zealous citizen, honoured alike here with Dante, Galileo, and with Machiavelli. At twenty-nine years of age, Michelangelo was a great artist, had sculptured the 'David,' and drawn the Pisan cartoon. To the age of eighty-nine he maintained his active life, though saddened by the greatest of sorrows, that of seeing his city enslaved, the city which he had so zealously defended, both with his patient, judicious counsel and with the force of his arm. This has been his sepulchre only since 1584, when his body was removed from the Church of the Apostoli in Rome. A few years ago I had to visit the tomb: within no form was found,—a few light ashes alone remained of the body. Of the great man alone remain his sublime works, and the records of his great virtues."

Doctor Professor Flarke, of the Academy of the Fine Arts at Saxe-Weimar, presenting the beautiful silver wreath, said:—"This silver crown, which we are charged to present to the City of Florence, is a gift from the German nation. Germans, from the Baltic to the Alps, are uniting with the Italian nation to do honour to the illustrious artist."

Professor Lutzow then presented the letter of congratulation to Peruzzi, and during a rather lengthened discourse, acknowledged with grateful words the artistic light and learning derived from Italy for Germany's benefit:—"From the cloudy north, beyond the snowy Alps, broke forth a horde of Germans desirous of light, and envious of Italy's blue sky. Bringing with them ruin and waste, they ruined themselves without being able to take back to their country the good they needed. But devastated Italy, generously returning good for evil, sent to their dark country the light of faith, of erudition, of the arts,—and the more she gave the richer she became, and when burst forth a new spring-time and Michelangelo produced works whose equal had not been since the time of Phidias, the seeds of the beautiful not only yielded its fruits in Italy, but throughout the world. Your Buonarotti was sent not only for Italy, but for Germany. In grateful remembrance we have resolved to place this day his bust in the paternal house of Goethe—the house held sacred by all Germans. May the people, united in peace and devotion, enjoy without envy the treasures of intellect which increase by participation. May we unite in respecting our great masters and models. While beyond the Alps we salute you with "Long live the memory of Michelangelo! Prosperity to the city of Florence! Prosperity to the Italian people!"

From Vienna was read a congratulatory address, from its Society of Artists, saying that they were honouring the day by uncovering a statue of the great artist placed before the house of the society.

From the church of Santa Croce the procession moved to the beautiful Piazzale of Michelangelo, where has been placed a bronze copy of the "David," and the inscriptions on the base of the pedestal were uncovered.

The sun was setting on the distant landscape, and on the hundreds of thousands of well-ordered persons assembled on one of the loveliest spots to be found in Europe.

On Monday, 13th, was inaugurated the remarkably interesting new Museum of Michelangelo in the building of the "Belle Arti." The "David" has had a temple erected for it; and now stands in an apse of the building, where it can be seen to greater advantage than ever. In a room adjoining have been placed casts, full-sized, of most of the great sculptor's works. His "Moses," "Pieta," the marvellous "Prigione" originally intended for the tomb of Julius II., the wonderful bust of Paul III., the so-called "Cupid" of the statues on the Medici tombs, and of the St. John Baptist discovered lately at Pisa, and in the possession of Count Rosselmini Gualandi; the crouching Caryatides, &c. A copy in oil (diminished) of the "Last Judgment" and a fresco are seen; and in a room set apart are perfect photographs of the different parts of the roof of the Sistine Chapel,—copies of sketches in the possession of the Pope,—sent by Pio Nono; copies of sketches in the Vienna Galleries, of those in the collection of the Queen of England at Windsor, in the University of Oxford, of those in the Louvre, and elsewhere.

Addresses were sent by the Royal Academy of Vienna, bound in a magnificent cover; also from the Viennese Society of Artists, from Copenhagen, Stockholm, Saxe-Weimar. It was painful to find no addresses from England; that all efforts to impel our art societies to send copies of the works we possess had failed. From our national and private collections a valuable addition might have been sent to the museum. It is never too late to mend, and space is left for many more works, and it is to be hoped we shall hasten to remedy the apparent lack of interest in the great artist, by forwarding copies of the works we possess. The museum is the most interesting part of the fêtes. The character of the man is seen in his great works. He determined, with his great force of will, to show the power and truth to be exhibited in marble; it is the reality and veracity of the human form that strikes the mind on looking on his works. There is not beauty, but pure truthfulness. The female figures of Michelangelo do not exhibit beauty. As said Allardi, "the Graces knocked at his door, but were not admitted." "His neighbour and follower, Raffaelle, however, gladly gave them entrance."

His ideas of beauty were of the highest degree, but his greatest aim was to show forth that beauty in exquisite degrees of perfect form. His life was one of hard struggles, severe disappointments, a suffering from injustices,—his heart bleeding for his country's misfortune. His patriotism created fresh bursts of genius in him, so that his countrymen could rely on his powers when his city's fortifications had to be raised, or on his deep religious zeal when the finest of temples was to be erected to God's honour. His patron, the warrior pope, could rely on his powers and untiring energy when adorning his chapel with the most glorious emanations from the human conception and hand of artist. Michel-angelo's love for woman took more the character of adoration, as may be seen by his sonnets. His nature—his genius—resembled those of Dante. They might have been of one family, sprung from the same race, living in the same age. Of both, their country are equally proud; and the honour done to the sculptor, painter, architect, engineer, and poet in one is as heartily felt by his compatriots as that rendered to their other poet some few years ago.

The Congress of Architects and Engineers was inaugurated later, and will continue during the week.

THE ÆSTHETICS OF HOUSE BUILDING.*

THE most noteworthy example of the consideration of house-planning in regard to effect only is Bacon's well-known essay "On Building," the title of which, by the way, must be regarded as conveying only the restricted sense in which the verb "to build" is still sometimes used in conversation, as referring merely to the speaker's intention to provide a house of his own, instead of renting one. In connexion with house-planning on a great scale, Bacon's remarks are interesting as indicating the view of the subject by a mind of the first order, greatly given to magnificence both in regard to mental and material tastes, and regarding the house as the most splendid and sumptuous outward adornment of life. His purely æsthetic view of the matter is sufficiently proved by the short and almost contemptuous sentence with which he dismisses the question of "offices," after giving a lengthened description of the show portion of his ideal house:—"As for offices, let them stand at a distance, with some low galleries to pass from them to the palace itself"; and this is all the notice he vouchsafes to that portion of the edifice, considered so all-important at present. It may fairly be questioned whether the reaction from the purely palatial idea of a large residence has not been carried too far in the present day, and the practical exalted to an undue prominence over the artistic. No doubt, the school of Vanbrugh, and of Soane, and the Adams, and others, carried the purely architectural theory of the mansion to an extremity, and left too good reason for the criticism of the nobleman, who remarked on seeing the plans of his new house, that it would be "very well for a heathen god." But the contempt for interior architectural effect, in the old sense of the words, seems exaggerated, and implies the decay of a sense of grandeur and princeliness in the style of a great dwelling, which was not without its value. This feeling crops up in the literature of the day a good deal. Mr. Trollope is very fond of giving a poke at architectural splendour, as when he satirises the Duke of Omnium's residence, where the architect, in contriving a magnificent entrance-hall "for his own honour and glory," had, he says, forgotten to furnish the Duke with any rooms in which he could live. Bulwer, a writer who inherited in a peculiar degree the taste for splendour and richness of surroundings which was characteristic of a former period of English society, evidently noted this modern change of taste, and gives a sort of typical hint of it in the remark of the Americanised *parvenu* in "My Novel," who shows his new house to his relative with the remark, "Handsome elevation—Classical, I take it, eh? But you should see the offices." This is just an epitome of the modern English notion in regard to a first-class house. Those architects who are engaged most in such work find that the demand for every possible expedient which can multiply and improve "creature-comforts" (to use an old-fashioned expression) in a house, especially in regard to the commissariat department, has reached an extreme point at the present time. To sacrifice real comfort for show is, of course, absurd. But there can be no question whatever that the preference for a fine effect in a house, even at the expense of some curtailment of its smaller comforts, implies a higher kind of taste than that which is content to inhabit an ugly and uninteresting building provided the kitchen department is adequate to the daily production of a first-class *menu*, and that every arrangement which can contribute to bodily comfort is proportionately elaborated. The former taste, though it may be carried too far, belongs at least to a mental, the other only to a material civilisation, which is what we are tending a great deal too much towards in the present generation.

We may take a hint or two further from Bacon's ideal palace. His notion of the approaches to it is conceived in a truly sumptuous spirit, though only added as an afterthought. "You must have before you come to the front three courts,—a green court, plain, with a wall about it; a second court, of the same, but more garnished with little turrets, or rather embellishments, on the wall; and a third court to make a square with the front, but not be built, nor yet enclosed with a naked wall, but enclosed with terraces leaded aloft, and fairly garnished on the three sides, and cloistered on the inside with pillars, and not with arches below." This last injunction against arches is curious as indicating the classical feeling already rising into prominence and endeavouring to displace the peculiarly Gothic feature—the arch. The system of courts, as indicated here, shows that Bacon appreciated the effectiveness of a gradual transition from a natural to an architectural character in the approaches, as well as the culminating effect of increased elaboration in each stage of the approach. Whether, on the other hand, a series of courts is the most effective way of approaching the main entrance may, perhaps, be questioned. It is picturesque, and the comparative seclusion it affords to the mansion itself gives some of that home-like character which a "palace" generally has a tendency to miss; but an avenue or broad drive, bordered perhaps with statuary or architectural adjuncts of some kind, is more stately. This might, of course, be added to Bacon's three courts, but the outer one would in that case need a grand central gate to furnish the culminating point of the approach, and thus form the real front entrance. In regard to the internal arrangement, the principle first insisted on in the essay "On Building" is that you cannot have a perfect palace, "except you have two several sides, the one for feasts and triumphs, the other for dwelling; to be uniform without, though severally partitioned within, and to be on both sides of a great and stately tower in the midst of the front, that, as it were, joineth them together on either hand." The philosopher, it will be observed, is with us in our advocacy of the tower as an adjunct of a great house; whether the central position is so good for it is another question: we should say that would give a little too much the aspect of a public building rather than a residence. But what are we to say of the direct architectural heresy of the two sides of the house for different objects, "severally partitioned within," but "uniform without"? Modern architectural criticism almost universally condemns this; yet the arrangement not only approved itself to such a mind as Bacon's, but has been practically the favourite one with the builders of nearly all the great houses of England since the Gothic period. The "stately homes" which are among the best show-places of the country, and which every one visits with pleasure, are nearly all on this formal architectural type, in which the outer ranges of windows and pilasters give no indication of the sometimes very irregular and involved internal plan, at certain nooks of which the visitor looks curiously out of the window to find out where, in the stately formal front which he had seen from without, the window of this little out-of-the-way "ante-chamber" or "closet" occurs. The probability is that he finds it is lighted by *half* one window of the range, the other half doing duty for some other nook or passage. There is really an interest of its own in this kind of odd discrepancy between the exterior and the interior, regarded as characteristic of the period and taste in which the building was contrived. In a new building such want of thought as to the relation between plan and design seems merely carelessness, and rather annoys one than otherwise.

At the same time Bacon's suggestion touches upon what really is one of the most important problems in regard to house-planning on a palatial scale,—the relative arrangement of show or reception rooms and of family dwelling-rooms. If the symmetrical design with a central feature is adopted as the leading idea of the building, there is no alternative as to the family rooms, except to falsify the external architectural design by getting them in irrespective of it, or to provide for them in a separate block. The latter system is far preferable as regards the combination of effect with truthfulness of design, though the difficulty of making it convenient in regard to internal thoroughfare and communication may be considerable. For where symmetry of external effect in the main block of buildings is an object, the family block, so to speak, unless forming part of a quadrangle in the rear, can only be added so as to join the main building cornerwise and leave the symmetry of its most important front unimpaired. To add it as a recessed wing at one end of the main centre is inconsistent with symmetry, as it is impossible to get anything to form a proper balance at the opposite extremity. The cornerwise arrangement is illustrated in Osborne, which may be taken as a sort of typical instance. The difficulty, of course, is the small space which is thus left for connexion and thoroughfare between the two blocks, and the lengthy routes which are formed in consequence; but as it is to be supposed that intercommunication between the show buildings and the dwellings is not very constant or continuous in such a case, this is of less importance than in mansions on not so palatial a scale. The attempt to combine this corner-wise grouping with absolute symmetry of the whole edifice is seen in the well-known and remarkable plan of Holkham, with its four symmetrically disposed angle-blocks; but, however stately and imposing on paper, the utterly unpractical character of such a plan in regard to intercommunication is too obvious to need remark; it represents an absolute sacrifice of convenience to effect, which is really bad æsthetic as well as bad plan. It is worth noting that the identical arrangement of Holkham occurs in the Château of La Muette, of which the plans are given in the old work by Androvet,—"*Les plus excellent Bâtiments de la France*"; but the pavilions are brought somewhat closer to the centre, and a circular staircase formed in what may be termed the "isthmus" which connects them with the main building.

We may assume, however, that regular blocks, irregularly or obliquely connected, afford the best solution of the problem of making the dwelling-rooms part of the design in a palatial mansion, without either interfering unduly with symmetry or making the design a contradiction to the plan. And such an arrangement affords also that very effect which we spoke of in our former article as suitable for the highest class of mansions,—"a symmetrically designed centre with unsymmetrically grouped dependencies."

The principle of internal grouping and arrangement to be adopted, in regard to effect, admits of much less question in the case of the show portion of a mansion of the highest rank than in any other. Here, where stateliness is above all a desideratum, there can be no hesitation in judging a symmetrical disposition of the rooms on each side of a centre to be preferable to every other; while the hall and grand staircase should openly and prominently bespeak the importance of the rooms to which they give access, in their spacious proportions and central position. No system of plan gives such opportunity for this description of effect as the Italian *cortile*. No ingenious or picturesque arrangement by which the staircase is put on one side or cornered, can equal, on the whole, the impressiveness and stately effect of the large central hall and symmetrically-disposed staircase. The employment of corridors, which in houses of lesser grade are not only a necessary means of intercommunication, but an important source of effect, is to a great extent superseded in the case of rooms intended mainly for ceremony, and in which the effect of direct communication *en suite* is much finer, of course, than a lobby and corridor connexion. There is always, however, the question whether the staircase, as the most open and public part of the house, should be made the main centre of effect, or whether the climax should rather be found in the principal saloon. We incline to regard the latter as the truer principle, in any houses beyond the ordinary dwelling-house size. It is true that in the palatial mansion, on a large scale, and where space need not be economised, the hall and staircase, carried up the full height of the building, do appear to afford the best opportunity for

* See p. 810, *ante*.

architectural grandeur of effect; still, we hold it at least a matter of doubt whether the access to the rooms should so eclipse the latter in effect as to produce an anti-climax. In that numerous class of mansions which are just a grade below the palatial class, and where a certain stateliness is aimed at without the ostensible setting apart of a set of rooms for ceremony only, there can be little doubt that the staircase ought to hold a secondary position, as an attempt to make it the principal centre of effect can only be carried out with a loss of space that might be better used, and by giving it a size and importance disproportioned to the rest of the house.

It is in this latter class of large, but not palatial houses, that the greatest variety of effects in planning is to be looked for, and may be indulged in; though these varieties may in fact be reduced to only two or three principles. We might call these the Classic or "formal" principle, the "informal" principle (which includes the Elizabethan and late Mediæval form), and the hap-hazard or "hide-and-seek" principle, which last is a great favourite among those who are "their own architects." The formal plan implies a central entrance and central hall, though not necessarily a centralised arrangement of the rooms. This was, however, the favourite arrangement during the Palladian period in England; a common form of plan being an octagonal or circular entrance-hall, leading through a vestibule and to a circular reception-room opposite, from which access was obtained to the other principal sitting-rooms disposed on either side of it. This is no doubt a remarkably dignified and effective plan for a house on a moderate scale, but it sacrifices domesticity of effect for dignity, by bringing the principal rooms too prominently and immediately opposite the entrance. Very frequently the staircase was interposed as part of the suite between the entrance and the reception saloon; in another kind of scheme not infrequent the stairs were more or less cornered, and the vestibule formed a colonnade from the hall to the saloon door. But in all these cases the source of the peculiarly dignified though un-homelike effect is in the direct central route from the entry to the drawing-room, by which the feeling of privacy and retirement is altogether sacrificed. In a comparatively small house, there must, in fact, be a choice between two objects,—homeliness or stateliness; there is not room to combine them. For those who prefer the latter quality in their dwelling it is a satisfaction to know that it can always be more or less attained, even in what might be called small houses, by a rigid adherence to symmetry and a centralisation. An extreme specimen of this is to be seen in a plan given in Gramm's *Der Architekt* (a very absurd book, by the way), in which a large entrance-vestibule leads to a square central hall, on the opposite side of which is the staircase, behind an arcade and occupying the width of the whole side of the hall, and to right and left the dining-room and drawing-room open from the centre of the opposite sides of the hall; two rooms of the same size and each ending in a circular apse. This is an extreme case of the entire subordination of comfort and privacy to the expression of spaciousness and dignity. The mistake (for it certainly is one) of making the dining and drawing rooms identical in size and shape, is, however, hardly to be found among even the most formal works of the best English architects of the Classic plan period, who, in fact, showed much taste in their variations upon the square, octagon, and circle for rooms for different objects. "Doddington," in Cheshire, by Wyatt, though not an example of the extreme of formal plan (for the hall is at one corner of the block, but entered centrally and with a centre door to the saloon opposite), is a good specimen of this variation in type of room,—the hall giving access to a circular saloon, to the left of which and entered from it, is a rectangular drawing-room; while the dining-room to left of these again, and running from front to back of the house, takes the form of a large straightsided room with the ends forming segments of a circle,—a shape very effective, and admirably suggestive in regard to decorative treatment. A prettily-planned domestic corner of a house is shown in Denton Hall, by Carr, where the principal bed-room suite fits into one angle of the house, approached by a circular staircase, the bed-room forming an angle room, the gentleman's dressing-room a small rectangular apartment opening from one side of it, and the lady's toilet chamber a large-sized octagon room opening from the other side,—a plan also susceptible of very pretty decorative contrast. But our further remarks on the æsthetics of plan must be deferred to another number.

LABOUR AND SCIENCE AT BRISTOL.

NOT content with the field offered in their own special Parliament, the Social Science Association, the investigators and advocates of the claims of labour, have obtained a share of the attention of the members of the British Association. Before referring to such points, brought before the latter body, as possess more special interest for our own readers, we must take occasion to express a regret which, we have little doubt, will be shared by the scientific, and indeed by the general, press. One prime method of engaging public interest in the discussions of the Association has been allowed to fall into inexplicable neglect. Both the Association and the public suffer from the want of any plain and authoritative programme, or general index, to the proceedings of the Association. Originally, as in similar cases is almost invariably the custom, the opening speech of the President called attention to the subjects about to be discussed. The occupation of the chair by some men of great eminence in science furnished occasion for giving a general review, not of the projected work of the opening session alone, but of the general state of scientific knowledge in Europe. To make such an essay at once lucid and complete tasked the energies of the most encyclopædic students. It was a task that very few men were competent satisfactorily to perform; and not only so, it was a proceeding unnecessary to take more frequently than at decennial, or at least quinquennial, intervals. Still the lustre which attended the comprehensive review of some of the ablest presidents has had the unfortunate effect of diverting the attention of their successors from the primary duty of their post. Thus a man who might be very eminent in his special branch of science, but who, from the absorbing nature of the studies to which his own fame was due, had missed the opportunity of keeping up to the progress of other departments of knowledge, was led to give, by way of opening speech, a history of his own study. Essays of this kind, no doubt, have great value, and, when they are all that they ought to be, lay hold on the attention with great authority. But, in themselves, they are rather fitted for the presidents of sections, than for the president of the Association. The accident of the profession or study followed by the president for a given year ought not, as matter either of good taste or of scientific arrangement, to tinge the whole proceedings of the year. Still more unfortunate has been the effort, witnessed for three successive years, to introduce controversial topics into the calm regions of pure science. We congratulate the president for the actual year on having broken through this pernicious habit. Nor can we omit to express admiration of the good taste with which Sir John Hawkshaw forbore to introduce into his speech any mention of the projected Channel tunnel. In a glance at the history of engineering, a subject which excites so much curiosity would certainly have found a place, had not the engineer himself been the speaker. The respect for his audience thus shown by Sir John Hawkshaw not only entitles him to very warm commendation, but furnishes an example which we hope may be followed on future occasions. None the less do we feel that the discussion of the history of any one branch of science is not the proper theme for the president of the British Association.

Every writer of a paper which is accepted for reading, at the meeting of any section of the Association, ought, we venture to suggest, to furnish a short *précis* of the contents. These abstracts, handed by the presidents or secretaries of the several sections to the general secretary, should be laid before the president as the materials for this address. The public would thus learn from the opening speech the general course of the subjects to be discussed in the various sections. Every member of the Association, and every reader of the daily reports, would know where to direct his attention. No subject would be omitted or overlaid by mischance; none would be forced into unnatural prominence. Some, we venture to hint, which have found a conflicting auditory at the present meeting, would have been excluded by a president who resolved not to allow the introduction of topics that had not yet attained the dignity of science, even if they had any *prima facie* claim to serious discussion anywhere. It would still be competent to the president to throw the light of his special knowledge on any of those points about to be discussed on which he felt especially at home. If this were taken as the normal idea of the opening speech, a very great advantage would follow. In after years the series of speeches would form a connected set of materials for the history of science, which is now far from being the case. The attention of the public, and indeed of the members of the Association, would receive just that degree of guidance which is most urgently demanded. The programme of every year would denote the work and the progress of that year. The special qualifications of each president would find a congenial field for activity, without, on the one hand, over-burdening that officer with the mass of general scientific study, or, on the other hand, giving to a special branch of science an accidental and disproportionate predominance. Opportunities for individual display might not be so conspicuous, but science and education would gain. We feel sure that there are few men fit to hold the office of president who would not be thankful if it were at once understood that such was expected to be the form of their opening address. And we believe that, even as matter of permanent individual reputation, each president would be actually the gainer.

Among those subjects brought before the Association, which can hardly as yet be ranked among the conquests of science, must be classed that of the relation of Labour to Capital. We are the last to deny that scientific investigation may shed a light on this subject. We should be among the last to assert that scientific inquiry, in any department of thought, must remain unproductive. We have always contended against the dangerous tendency, which nowhere becomes more rampant than in questions of social science, to confuse the logical results of given economical principles, with the actual results of the very mingled motives that spur and control human conduct. But to disentangle this web,—to show where science stops, and where human caprice begins to be supreme,—is, unquestionably one of the greatest services that science can render to society.

The lengthy report of the Committee on Combinations in Capital and Labour, which was read in the section of Economic Science on the 31st of August, and of which we have printed the pith, does not contain very much that will be novel to our readers. The working classes were adequately represented not merely by members of the committee, but by a deputation of three members of the Bristol Trades Council added to their number.

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His ideas of beauty were of the highest degree, but his greatest aim was to show forth that beauty in exquisite degrees of perfect form. His life was one of hard struggles, severe disappointments, a suffering from injustices,—his heart bleeding for his country's misfortune. His patriotism created fresh bursts of genius in him, so that his countrymen could rely on his powers when his city's fortifications had to be raised, or on his deep religious zeal when the finest of temples was to be erected to God's honour. His patron, the warrior pope, could rely on his powers and untiring energy when adorning his chapel with the most glorious emanations from the human conception and hand of artist. Michelangelo's love for woman took more the character of adoration, as may be seen by his sonnets. His nature—his genius—resembled those of Dante. They might have been of one family, sprung from the same race, living in the same age. Of both, their country are equally proud; and the honour done to the sculptor, painter, architect, engineer, and poet in one is as heartily felt by his compatriots as that rendered to their other poet some few years ago.

The Congress of Architects and Engineers was inaugurated later, and will continue during the week.

THE ÆSTHETICS OF HOUSE BUILDING.*

THE most noteworthy example of the consideration of house-planning in regard to effect only is Bacon's well-known essay "On Building," the title of which, by the way, must be regarded as conveying only the restricted sense in which the verb "to build" is still sometimes used in conversation, as referring merely to the speaker's intention to provide a house of his own, instead of renting one. In connexion with house-planning on a great scale, Bacon's remarks are interesting as indicating the view of the subject by a mind of the first order, greatly given to magnificence both in regard to mental and material tastes, and regarding the house as the most splendid and sumptuous outward adornment of life. His purely æsthetic view of the matter is sufficiently proved by the short and almost contemptuous sentence with which he dismisses the question of "offices," after giving a lengthened description of the show portion of his ideal house:—"As for offices, let them stand at a distance, with some low galleries to pass from them to the palace itself"; and this is all the notice he vouchsafes to that portion of the edifice, considered so all-important at present. It may fairly be questioned whether the reaction from the purely palatial idea of a large residence has not been carried too far in the present day, and the practical exalted to an undue prominence over the artistic. No doubt, the school of Vanbrugh, and of Soane, and the Adams, and others, carried the purely architectural theory of the mansion to an extremity, and left too good reason for the criticism of the nobleman, who remarked on seeing the plans of his new house, that it would be "very well for a heathen god." But the contempt for interior architectural effect, in the old sense of the words, seems exaggerated, and implies the decay of a sense of grandeur and princeliness in the style of a great dwelling, which was not without its value. This feeling crops up in the literature of the day a good deal. Mr. Trollope is very fond of giving a poke at architectural splendour, as when he satirises the Duke of Omnium's residence, where the architect, in contriving a magnificent entrance-hall "for his own honour and glory," had, he says, forgotten to furnish the Duke with any rooms in which he could live. Bulwer, a writer who inherited in a peculiar degree the taste for splendour and richness of surroundings which was characteristic of a former period of English society, evidently noted this modern change of taste, and gives a sort of typical hint of it in the remark of the Americanised *parvenu* in "My Novel," who shows his new house to his relative with the remark, "Handsome elevation—Classical, I take it, eh? But you should see the offices." This is just an epitome of the modern English notion in regard to a first-class house. Those architects who are engaged most in such work find that the demand for every possible expedient which can multiply and improve "creature-comforts" (to use an old-fashioned expression) in a house, especially in regard to the commissariat department, has reached an extreme point at the present time. To sacrifice real comfort for show is, of course, absurd. But there can be no question whatever that the preference for a fine effect in a house, even at the expense of some curtailment of its smaller comforts, implies a higher kind of taste than that which is content to inhabit an ugly and uninteresting building provided the kitchen department is adequate to the daily production of a first-class *menu*, and that every arrangement which can contribute to bodily comfort is proportionately elaborated. The former taste, though it may be carried too far, belongs at least to a mental, the other only to a material civilisation, which is what we are tending a great deal too much towards in the present generation.

We may take a hint or two further from Bacon's ideal palace. His notion of the approaches to it is conceived in a truly sumptuous spirit, though only added as an afterthought. "You must have before you come to the front three courts,—a green court, plain, with a wall about it; a second court, of the same, but more garnished with little turrets, or rather embellishments, on the wall; and a third court to make a square with the front, but not be built, nor yet enclosed with a naked wall, but enclosed with terraces leaded aloft, and fairly garnished on the three sides, and cloistered on the inside with pillars, and not with arches below." This last injunction against arches is curious as indicating the classical feeling already rising into prominence and endeavouring to displace the peculiarly Gothic feature—the arch. The system of courts, as indicated here, shows that Bacon appreciated the effectiveness of a gradual transition from a natural to an architectural character in the approaches, as well as the culminating effect of increased elaboration in each stage of the approach. Whether, on the other hand, a series of courts is the most effective way of approaching the main entrance may, perhaps, be questioned. It is picturesque, and the comparative seclusion it affords to the mansion itself gives some of that home-like character which a "palace" generally has a tendency to miss; but an avenue or broad drive, bordered perhaps with statuary or architectural adjuncts of some kind, is more stately. This might, of course, be added to Bacon's three courts, but the outer one would in that case need a grand central gate to furnish the culminating point of the approach, and thus form the real front entrance. In regard to the internal arrangement, the principle first insisted on in the essay "On Building" is that you cannot have a perfect palace, "except you have two several sides, the one for feasts and triumphs, the other for dwelling; to be uniform without, though severally partitioned within, and to be on both sides of a great and stately tower in the midst of the front, that, as it were, joineth them together on either hand." The philosopher, it will be observed, is with us in our advocacy of the tower as an adjunct of a great house; whether the central position is so good for it is another question: we should say that would give a little too much the aspect of a public building rather than a residence. But what are we to say of the direct architectural heresy of the two sides of the house for different objects, "severally partitioned within," but "uniform without"? Modern architectural criticism almost universally condemns this; yet the arrangement not only approved itself to such a mind as Bacon's, but has been practically the favourite one with the builders of nearly all the great houses of England since the Gothic period. The "stately homes" which are among the best show-places of the country, and which every one visits with pleasure, are nearly all on this formal architectural type, in which the outer ranges of windows and pilasters give no indication of the sometimes very irregular and involved internal plan, at certain nooks of which the visitor looks curiously out of the window to find out where, in the stately formal front which he had seen from without, the window of this little out-of-the-way "ante-chamber" or "closet" occurs. The probability is that he finds it is lighted by *half* one window of the range, the other half doing duty for some other nook or passage. There is really an interest of its own in this kind of odd discrepancy between the exterior and the interior, regarded as characteristic of the period and taste in which the building was contrived. In a new building such want of thought as to the relation between plan and design seems merely carelessness, and rather annoys one than otherwise.

At the same time Bacon's suggestion touches upon what really is one of the most important problems in regard to house-planning on a palatial scale,—the relative arrangement of show or reception rooms and of family dwelling-rooms. If the symmetrical design with a central feature is adopted as the leading idea of the building, there is no alternative as to the family rooms, except to falsify the external architectural design by getting them in irrespective of it, or to provide for them in a separate block. The latter system is far preferable as regards the combination of effect with truthfulness of design, though the difficulty of making it convenient in regard to internal thoroughfare and communication may be considerable. For where symmetry of external effect in the main block of buildings is an object, the family block, so to speak, unless forming part of a quadrangle in the rear, can only be added so as to join the main building cornerwise and leave the symmetry of its most important front unimpaired. To add it as a recessed wing at one end of the main centre is inconsistent with symmetry, as it is impossible to get anything to form a proper balance at the opposite extremity. The cornerwise arrangement is illustrated in Osborne, which may be taken as a sort of typical instance. The difficulty, of course, is the small space which is thus left for connexion and thoroughfare between the two blocks, and the lengthy routes which are formed in consequence; but as it is to be supposed that intercommunication between the show buildings and the dwellings is not very constant or continuous in such a case, this is of less importance than in mansions on not so palatial a scale. The attempt to combine this corner-wise grouping with absolute symmetry of the whole edifice is seen in the well-known and remarkable plan of Holkham, with its four symmetrically disposed angle-blocks; but, however stately and imposing on paper, the utterly unpractical character of such a plan in regard to intercommunication is too obvious to need remark; it represents an absolute sacrifice of convenience to effect, which is really bad æsthetic as well as bad plan. It is worth noting that the identical arrangement of Holkham occurs in the Château of La Muette, of which the plans are given in the old work by Androvet,—"*Les plus excellent Bâtiments de la France*"; but the pavilions are brought somewhat closer to the centre, and a circular staircase formed in what may be termed the "isthmus" which connects them with the main building.

We may assume, however, that regular blocks, irregularly or obliquely connected, afford the best solution of the problem of making the dwelling-rooms part of the design in a palatial mansion, without either interfering unduly with symmetry or making the design a contradiction to the plan. And such an arrangement affords also that very effect which we spoke of in our former article as suitable for the highest class of mansions,—"a symmetrically designed centre with unsymmetrically grouped dependencies."

The principle of internal grouping and arrangement to be adopted, in regard to effect, admits of much less question in the case of the show portion of a mansion of the highest rank than in any other. Here, where stateliness is above all a desideratum, there can be no hesitation in judging a symmetrical disposition of the rooms on each side of a centre to be preferable to every other; while the hall and grand staircase should openly and prominently bespeak the importance of the rooms to which they give access, in their spacious proportions and central position. No system of plan gives such opportunity for this description of effect as the Italian *cortile*. No ingenious or picturesque arrangement by which the staircase is put on one side or cornered, can equal, on the whole, the impressiveness and stately effect of the large central hall and symmetrically-disposed staircase. The employment of corridors, which in houses of lesser grade are not only a necessary means of intercommunication, but an important source of effect, is to a great extent superseded in the case of rooms intended mainly for ceremony, and in which the effect of direct communication *en suite* is much finer, of course, than a lobby and corridor connexion. There is always, however, the question whether the staircase, as the most open and public part of the house, should be made the main centre of effect, or whether the climax should rather be found in the principal saloon. We incline to regard the latter as the truer principle, in any houses beyond the ordinary dwelling-house size. It is true that in the palatial mansion, on a large scale, and where space need not be economised, the hall and staircase, carried up the full height of the building, do appear to afford the best opportunity for

* See p. 810, *ante*.

architectural grandeur of effect; still, we hold it at least a matter of doubt whether the access to the rooms should so eclipse the latter in effect as to produce an anti-climax. In that numerous class of mansions which are just a grade below the palatial class, and where a certain stateliness is aimed at without the ostensible setting apart of a set of rooms for ceremony only, there can be little doubt that the staircase ought to hold a secondary position, as an attempt to make it the principal centre of effect can only be carried out with a loss of space that might be better used, and by giving it a size and importance disproportioned to the rest of the house.

It is in this latter class of large, but not palatial houses, that the greatest variety of effects in planning is to be looked for, and may be indulged in; though these varieties may in fact be reduced to only two or three principles. We might call these the Classic or "formal" principle, the "informal" principle (which includes the Elizabethan and late Mediæval form), and the hap-hazard or "hide-and-seek" principle, which last is a great favourite among those who are "their own architects." The formal plan implies a central entrance and central hall, though not necessarily a centralised arrangement of the rooms. This was, however, the favourite arrangement during the Palladian period in England; a common form of plan being an octagonal or circular entrance-hall, leading through a vestibule and to a circular reception-room opposite, from which access was obtained to the other principal sitting-rooms disposed on either side of it. This is no doubt a remarkably dignified and effective plan for a house on a moderate scale, but it sacrifices domesticity of effect for dignity, by bringing the principal rooms too prominently and immediately opposite the entrance. Very frequently the staircase was interposed as part of the suite between the entrance and the reception saloon; in another kind of scheme not infrequent the stairs were more or less cornered, and the vestibule formed a colonnade from the hall to the saloon door. But in all these cases the source of the peculiarly dignified though un-homelike effect is in the direct central route from the entry to the drawing-room, by which the feeling of privacy and retirement is altogether sacrificed. In a comparatively small house, there must, in fact, be a choice between two objects,—homeliness or stateliness; there is not room to combine them. For those who prefer the latter quality in their dwelling it is a satisfaction to know that it can always be more or less attained, even in what might be called small houses, by a rigid adherence to symmetry and a centralisation. An extreme specimen of this is to be seen in a plan given in Gramm's *Der Architekt* (a very absurd book, by the way), in which a large entrance-vestibule leads to a square central hall, on the opposite side of which is the staircase, behind an arcade and occupying the width of the whole side of the hall, and to right and left the dining-room and drawing-room open from the centre of the opposite sides of the hall; two rooms of the same size and each ending in a circular apse. This is an extreme case of the entire subordination of comfort and privacy to the expression of spaciousness and dignity. The mistake (for it certainly is one) of making the dining and drawing rooms identical in size and shape, is, however, hardly to be found among even the most formal works of the best English architects of the Classic plan period, who, in fact, showed much taste in their variations upon the square, octagon, and circle for rooms for different objects. "Doddington," in Cheshire, by Wyatt, though not an example of the extreme of formal plan (for the hall is at one corner of the block, but entered centrally and with a centre door to the saloon opposite), is a good specimen of this variation in type of room,—the hall giving access to a circular saloon, to the left of which and entered from it, is a rectangular drawing-room; while the dining-room to left of these again, and running from front to back of the house, takes the form of a large straightsided room with the ends forming segments of a circle,—a shape very effective, and admirably suggestive in regard to decorative treatment. A prettily-planned domestic corner of a house is shown in Denton Hall, by Carr, where the principal bed-room suite fits into one angle of the house, approached by a circular staircase, the bed-room forming an angle room, the gentleman's dressing-room a small rectangular apartment opening from one side of it, and the lady's toilet chamber a large-sized octagon room opening from the other side,—a plan also susceptible of very pretty decorative contrast. But our further remarks on the æsthetics of plan must be deferred to another number.

LABOUR AND SCIENCE AT BRISTOL.

NOT content with the field offered in their own special Parliament, the Social Science Association, the investigators and advocates of the claims of labour, have obtained a share of the attention of the members of the British Association. Before referring to such points, brought before the latter body, as possess more special interest for our own readers, we must take occasion to express a regret which, we have little doubt, will be shared by the scientific, and indeed by the general, press. One prime method of engaging public interest in the discussions of the Association has been allowed to fall into inexplicable neglect. Both the Association and the public suffer from the want of any plain and authoritative programme, or general index, to the proceedings of the Association. Originally, as in similar cases is almost invariably the custom, the opening speech of the President called attention to the subjects about to be discussed. The occupation of the chair by some men of great eminence in science furnished occasion for giving a general review, not of the projected work of the opening session alone, but of the general state of scientific knowledge in Europe. To make such an essay at once lucid and complete tasked the energies of the most encyclopædic students. It was a task that very few men were competent satisfactorily to perform; and not only so, it was a proceeding unnecessary to take more frequently than at decennial, or at least quinquennial, intervals. Still the lustre which attended the comprehensive review of some of the ablest presidents has had the unfortunate effect of diverting the attention of their successors from the primary duty of their post. Thus a man who might be very eminent in his special branch of science, but who, from the absorbing nature of the studies to which his own fame was due, had missed the opportunity of keeping up to the progress of other departments of knowledge, was led to give, by way of opening speech, a history of his own study. Essays of this kind, no doubt, have great value, and, when they are all that they ought to be, lay hold on the attention with great authority. But, in themselves, they are rather fitted for the presidents of sections, than for the president of the Association. The accident of the profession or study followed by the president for a given year ought not, as matter either of good taste or of scientific arrangement, to tinge the whole proceedings of the year. Still more unfortunate has been the effort, witnessed for three successive years, to introduce controversial topics into the calm regions of pure science. We congratulate the president for the actual year on having broken through this pernicious habit. Nor can we omit to express admiration of the good taste with which Sir John Hawkshaw forbore to introduce into his speech any mention of the projected Channel tunnel. In a glance at the history of engineering, a subject which excites so much curiosity would certainly have found a place, had not the engineer himself been the speaker. The respect for his audience thus shown by Sir John Hawkshaw not only entitles him to very warm commendation, but furnishes an example which we hope may be followed on future occasions. None the less do we feel that the discussion of the history of any one branch of science is not the proper theme for the president of the British Association.

Every writer of a paper which is accepted for reading, at the meeting of any section of the Association, ought, we venture to suggest, to furnish a short *précis* of the contents. These abstracts, handed by the presidents or secretaries of the several sections to the general secretary, should be laid before the president as the materials for this address. The public would thus learn from the opening speech the general course of the subjects to be discussed in the various sections. Every member of the Association, and every reader of the daily reports, would know where to direct his attention. No subject would be omitted or overlaid by mischance; none would be forced into unnatural prominence. Some, we venture to hint, which have found a conflicting auditory at the present meeting, would have been excluded by a president who resolved not to allow the introduction of topics that had not yet attained the dignity of science, even if they had any *prima facie* claim to serious discussion anywhere. It would still be competent to the president to throw the light of his special knowledge on any of those points about to be discussed on which he felt especially at home. If this were taken as the normal idea of the opening speech, a very great advantage would follow. In after years the series of speeches would form a connected set of materials for the history of science, which is now far from being the case. The attention of the public, and indeed of the members of the Association, would receive just that degree of guidance which is most urgently demanded. The programme of every year would denote the work and the progress of that year. The special qualifications of each president would find a congenial field for activity, without, on the one hand, over-burdening that officer with the mass of general scientific study, or, on the other hand, giving to a special branch of science an accidental and disproportionate predominance. Opportunities for individual display might not be so conspicuous, but science and education would gain. We feel sure that there are few men fit to hold the office of president who would not be thankful if it were at once understood that such was expected to be the form of their opening address. And we believe that, even as matter of permanent individual reputation, each president would be actually the gainer.

Among those subjects brought before the Association, which can hardly as yet be ranked among the conquests of science, must be classed that of the relation of Labour to Capital. We are the last to deny that scientific investigation may shed a light on this subject. We should be among the last to assert that scientific inquiry, in any department of thought, must remain unproductive. We have always contended against the dangerous tendency, which nowhere becomes more rampant than in questions of social science, to confuse the logical results of given economical principles, with the actual results of the very mingled motives that spur and control human conduct. But to disentangle this web,—to show where science stops, and where human caprice begins to be supreme,—is, unquestionably one of the greatest services that science can render to society.

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absence of any reference to such patent cases of minimum wages, the lucubrations of the committee on the subject are hardly entitled to the consideration they might otherwise have commanded.

In face of such flagrant facts as these, there is more than a question as to the truth and wisdom of the assertion, 'Primarily the wages of labour are determined by the amount of capital available for the purpose of wages in relation to the number of labourers competing for the same." This statement can only be made out to be true by using the word "available" in such a restricted sense as to convert the maxim into a platitude. It is not because there is not ample "capital available" for shirt-makers that these poor women are ground down to skin and bone. It is not because they are so numerous as to "compete" for the iniquitous pittance of the employer. It is because the employers have neither hearts nor bowels,—because they take advantage, as many an employer who goes to church in a very glossy coat is apt to do, of the feebleness of their dependents,—of their need, of their ignorance,—that these things are. There is ample capital for making shirts. But when one retail dealer offers them at the minimum price to the public, and another, to filch his custom, offers them at a yet lower minimum, not only will the worst and cheapest materials be selected, but, as we see, a tyrannical abuse of the position of the employer is superadded, which it is a mere mockery to speak of as a function of "capital," or want of capital.

In passing from theoretic deductions from those assumed "laws" which are the object of so much superstitious veneration, to more practical questions, the report brings important truths into full prominence. That the arbitrary determination of a fixed remuneration for labour, irrespective of skill, would be a misfortune to the workman as well as to the consumer, is a point as to which no man of ordinary education, honesty, and information, can have any doubt. That the worst enemy of the industrious workman is the man who would make both the wages, and the production, of the idle or unskilled workman the general limit and measure of industry, hardly needs argument to prove.

The general truth, that attempts to raise the price of the remuneration of labour by artificial means must be in the long run not only futile, but absolutely mischievous to the workman, is held by the committee. It is well that steps should be taken, as proposed at the meeting of the section, to spread the knowledge of this truth among the working classes. It would be well were this done with the pregnant wit and pithy language of a writer like Bunyan or De Foe. The question of uniformity of wages may at once be dismissed as one of artificial restriction, as well as of intolerable tyranny. No law of the time of Elizabeth to make the sturdy knave work is so gross an interference with personal liberty as this attempt on the part of some of the self-constituted advisers of the workman.

The question of piecework was also discussed, and the general idea that its natural tendency is to increase quantity of production at the expense of quality was well brought out. In fact, it is a mode of contract which, though demanding more than ordinary care in supervision, is decidedly to the advantage not only of the employer but of the workman. To the former it saves in contingent expenses, such as rent, light, engine-power, and accommodation of all kinds for workmen. To the latter it affords a remuneration proportionate to his industry. Like the foregoing questions, when properly regarded, it is not a question between master and man, but one between the idle, and the industrious, workman. With the interests of the latter are intimately bound up those of the employer, and those of the nation. It is, therefore, for them, and in opposition to those of the idle workman, that our sympathy is awakened.

An admirable illustration of this view was offered to the Section by Mr. Robinson, a Bristol manufacturer. He allowed three of his men to exchange day-work for piece-work. Under the former system, the men had respectively earned 25s., 30s., and 35s. a week; under the latter, their respective earnings were 35s., 42s., and 25s. per week. It will not do to generalise rapidly on few *data*, as it is possible that the assessment of the piecework prices was inequitable. Thus a man whose known skill could command 35s. per week, might have less to show for his time, while it was actually quite as usefully employed, than the man who was rated at 10s. less. The other cause of difference of result would, of course, be difference of industry. Leaving the question open, whether the third workman was an idle fellow, overpaid by day-work, or a skilled workman underpaid by mis-rating his piece-work, we find that while the first earned 10s. a week more for himself under the latter than under the former system, he only earned for his master (on the assumption that the master's profit is one-third of the wage) 3s. 4d. more. The second workman, again, earned 17s. more for himself, and only 5s. 8d. more for his master by piecework. Whatever, then, be the advantage gained by employers by this system, it is but small in proportion to that gained by the men themselves.

The committee made the wise recommendation that workmen should be admitted to the meetings of Section F at a reduced rate. They refer to an effort for the teaching of political economy to the working classes, which we can only hope will be attempted on those broad and comprehensive principles which theorists on that subject are too apt to neglect. They conclude by the warning that, in the great contest which Britain has to wage with other industrial nations, it is in the interest both of masters and men to be very careful lest, by raising the prices of British produce and manufacture too high, they should no longer be able to carry the palm in the arena of international competition!

It was agreed to send the report to every trade-union and to every masters' combination in the country.

The paper on the employment of gentlewomen as domestic servants was one which we are unable to understand as in any way fit for discussion by the Association. The remarks made on it in the Section by Mrs. Grey were so true and so just, that it is extraordinary that the same considerations did not occur to those who had the responsibility of selecting papers to be read. This is a case in which the recurrence to such a description of inaugural speech as we have suggested would have been of use. The subject of women's work is one deserving of the most serious attention. It is one as to which a vast body of valuable information is to be derived from what is now going on in Austria. But the proposal brought before the Association is one that would seem to involve almost every possible disadvantage to all classes.

Professor Jevons again returned to the subject of the exhaustion of the coal fields, and very fully supported the views that we have repeatedly urged on that important topic. He showed that the annual rate of increase of consumption, so far from having been overrated in his previous calculations, was now actually in excess of those calculations; and that the actual increase of consumption is at the rate of three and a half per cent. per annum, not in arithmetical, but in geometrical, progression. The total produce of 1873 is estimated at 128,680,130 tons, according to the report of the inspectors of mines. The quantity consumed for domestic purposes was estimated at one ton per head per annum of the whole population, or between thirty and forty millions of tons. The total exports of coal are only from twelve to fourteen millions of tons per annum. Thus some eighty millions of tons represent the motive and manufacturing power of the country. The waste in consumption, whether for manufacturing or for domestic purposes, is, no doubt, enormous. It was lamented by the president in his address, and admitted by all the speakers. The most economical compound engines only obtain one-eleventh part of the theoretic value of coal, measured in foot-pounds. At the same time, when we consider what is the result of the combustion, in round numbers, of a quarter of a million tons of coal per working-day throughout the year in the production of mechanical power, we can form some faint idea of the service rendered by the steam engine to the country.

Another point of much interest is connected with the science of naval structure; namely, the theory of stream lines, which was brought forward by Mr. W. Froude, C.E., in an elaborate and carefully-written paper. We have not space at present to enter into the views of this paper. It must suffice to say that the main result was to resolve all the resistance offered to the onward movement of a ship into surface friction, wave resistance, and eddy. The third element, which in a canal is very considerable, is almost inappreciable on the ocean. Mr. Froude's main object seems to be to destroy the ordinary notion that there is a head resistance to the movement of a vessel. No doubt our knowledge of the best form for a vessel will be enlarged by accurate analysis of all the elements that affect her course. But, after all, the wave resistance of Mr. Froude is tantamount to head resistance. We fail to see that this visible cause of resistance is represented in the course of a current of water through a pipe. And we are far from being yet convinced that there is not a direct impact of the prow on the inert mass of the sea. The mode in which a jet of water is thrown up by the bow of a vessel in rapid motion is something more than a wave. It is a leap of the water, the results of a blow or series of blows. And the extraordinary rate at which resistance increases, in proportion to speed, is not according to the laws of friction, nor, it seems to us, according to those of hydrostatic pressure, if such be the theory of the wave. It seems again to point rather to impact than to pressure. We should hesitate to throw out these suggestions but for the fact that we do not find the remarkable disproportion between increase of power and increase of speed discussed in Mr. Froude's paper.

Mr. W. Topley's report on the sub-Wealden exploration states that a depth of 1,792 ft. has been reached by the diamond boring apparatus in the short space of six months. The expectation of reaching available coal is disappointed, but the geological information obtained is of some value. Professor E. Hébert read an interesting paper on the undulation of the chalk formation in France, from which he formed an unfavourable judgment as to the possibility of the Channel tunnel,—a view that was controverted by Sir John Hawkshaw.

We regret to observe the want of adequate support which is endangering the permanence of one of the most useful and honourable of the scientific works of the day, the notation of rainfall organised by Mr. G. J. Symonds. It would be nothing short of a national disgrace to allow this important service to collapse for want of funds. Mr. Bramwell's discourse on railway safety appliances attracted a numerous auditory. It will be seen that questions connected either with the development of industry, or with the scientific principles which regulate the application of industry, have occupied no inconsiderable share of the attention of the Association in its meeting of 1875.

THE ARCHITECTURAL ASSOCIATION.

THE ANGOULÊME EXCURSION.

EXCEPT for the results which must follow from the excursion, it is now an affair of the past, having been fully completed without any departure from the programme of the slightest consequence,—a performance due to the admirable arrangements organised by Mr. Sharpe, and carried out under the assiduous supervision of the two secretaries of the Association, Mr. Flint Clarkson and Mr. Hayes, whose labours were no sinecure, much alleviated, it is only right to add, by the energy and invariable good feeling of every member of the expedition.

The account we gave last week brought the proceedings down to the return to Angoulême on Saturday, the 4th inst. Monday, September 6, was a comparatively easy day as respects the time of starting and the work performed, but the heat was intense. The first pause was made at Chateauneuf, where the church is a large and very fine one, and which alone of the twelfth-century churches as yet visited has aisles. The nave, which has six bays, alone remains of the original structure. The work of chief merit is the west front. This consists of two stories and a gable. The lower story has the almost invariable arrangement of three arches, of which the central arch is the most important, and contains the doorway. The capitals are very fine. A bold cornice, carried on quaintly-sculptured corbels, which show a remarkable power of expression and of execution, separates the lower from the story above. This is not, as is very usual, arcaded with small arches, but has a window over the door, with a fine figure of an apostle on each side, that of St. Peter occupying the *dexter* place. But the great feature of this story, and, indeed, of the entire façade, is the left-hand arch, and the equestrian figure which it contains. There are several instances of these equestrian figures: they have been referred to at Chalais and at Aubeterre. It seems to have been established by the Abbé Michon, and accepted by Mr. Sharpe, that it marks the tomb of the founder of the church. This figure, in its

style, reminds us of the early Greek sculptures, and, indeed, would have done no discredit to the grandfather of Phidias, supposing him to have been a sculptor. Careful pencil drawings and a good photograph have been taken of this figure, which, if published, will form one of the gems of the collection. The examination of this church occupied the time assigned to St. Simon, which was, therefore, left uninvestigated.

Bassac, surrounded by the cloisters and various buildings of its ancient monastery, has a very fine west front, of the thirteenth century, showing in its composition much reference to the designs of the older churches of the district, especially in its west door, with floriated capitals instead of the intertwined basilisks and other monsters. On the north side of the church, however, is a fine relic of twelfth-century work, viz., a tower, springing from very narrow arches below, and supporting a dome, and having two external stories above the roof, of which the upper is remarkably simple and fine. The old tower has again been surmounted by two stories, of early thirteenth-century work, of four arcades in each, and terminating in a circular spire of the usual pineapple character already described at La Palud. The vertical lines, however, of the newer construction have been carried up in a rather haphazard manner; but the proportions are well studied, and the general effect is good, and, with the exception of the spireless tower of Angoulême Cathedral, is by far the most important in the district. Mention should be made of the fortified turrets or "*quoins d'avantage*," which occupy the north and south angles at the summit of the west front (built in the fifteenth century, to render the church a defensible stronghold during the wars with England), which have their own supports and proper-shaped buttresses carried up from the very base, and which materially improve the composition of the west front, by strengthening the angles. A very large proportion of the churches visited have some fortified features about them, chiefly added during the wars of religion in the sixteenth century; but in these, as it may be supposed, no consideration was paid to the architectural character of the building. From Bassac the expedition returned to Angoulême. On Tuesday morning the members of the Association went to the Évêche, to pay their respects to the Bishop of Angoulême, and also to see some curious gems and croziers, which belonged to the early bishops of the diocese. The bishop, a very dignified ecclesiastic, received the party very courteously. The opportunity was not lost of endeavouring to enlist his sympathies in favour of the conservative restoration of churches. The first church then visited was Bourg Charente, one of the most beautiful of the district. The chief feature was the east end,—a fine apse, having three arcaded stories externally, grouping well with the two subordinate apses which projected from the walls of the transepts. The west front is also good, with the usual three-arch arrangement, the doorway, especially, having very good capitals. The nave has three domes, and there is another at the crossing.

Gensac has been much restored, with a new tower and spire, but much of the original west front remains. At this place a marriage ceremony, under circumstances which seemed to create much local interest, formed a counteraction to that of staring at the English architects, but it impeded the examination of the interior. This is the most interesting part of the church. The nave has four domes, and has also a continuous cornice of considerable projection, returned across the west end, and having narrow passages behind the wall-piers, which form a sort of triforium.

Cognac was the resting-place for the night, and the church of St. Leger the architectural object of attraction. This was originally one of the finest churches of the Charente district, but has been much altered. Three fine bays,—two of the nave, and one forming the crossing,—are mainly of twelfth-century work, and much resembling Angoulême Cathedral; but the supports intended for the domes are now surmounted by quadripartite vaults. The west front has the usual three arches, of very fine architecture, and considerable remains of the upper arcading. The day had been even hotter than the preceding, but the evening was agreeably passed in the gardens and drawing-room of M. Robin, a gentleman of English extraction, and one of the principal merchants of the town, the staple of which is well known; and on Wednesday morning a visit to one of the large establishments of the place shared with St. Leger the time devoted to Cognac; and thence the excursionists proceeded to Chastres, once a fine Cistercian abbey, of which the church, now desecrated and rapidly falling into ruin, alone remains. The abbey was placed at the bottom of a hill, the usual situation of Cistercian abbeys; and on the hill above it is the château of Guard l'Épée, which has some interesting remains, especially a fine gateway of Renaissance architecture.

The church of Chastres is a very fine, but rather late example of the twelfth century, almost verging on the thirteenth, but is still pre-Transitional. The interior has four domed bays, one occupying the crossing, and beyond is a bay of late thirteenth-century work, with quadripartite vaulting. The west front has a fine doorway, but the two arches on each side, as seems generally to be the case in the latest examples of the architecture peculiar to the district, have become mere appendages. There is a handsome range of small arcades above. From Chastres the party proceeded to Angoulême. In the evening, M. Abbadie, the architect to Angoulême Cathedral, and the restorer (!) of St. Front Perigueux, came to see Mr. Sharpe and the Association, and, as was to be expected, lively but very courteous discussion arose on the limits to which the demolition of old decayed work should be carried. No one thought that M. Abbadie had the best of the argument.

On Thursday morning the four o'clock breakfast hour had been looked upon as the test of the earnestness of the expedition, and a roll-call was instituted by the Secretaries; no defaulters, however, were found. As respects the day's work, Plaizac, Rouillac, and Gourville, were of comparatively small interest. The first the best, with a very good but simple doorway. The best point, however, was a very good corbelled cornice on the south side. Rouillac is picturesque; but, excepting the choir and two other easterly apses, unimportant in an architectural aspect. Gourville, one instance among several, showed that the extraordinary weight of the early vaulting, whether domed or wagon-headed, had overpowered the supports, which now stand leaning outwards and covered by a flat timber roof and ceiling. In some places a fear of a similar catastrophe had led to the comparatively recent addition of external buttresses,—huge beyond the analogy of any other district. The rapid survey of these three churches gave more time for the noble church of Lanville, formerly an abbey of the order of St. Geneviève, but destroyed in the sixteenth century. The west front is of the twelfth century. The three-arch arrangement of the bottom story, however, is here absent. The east end is remarkably fine, and also of the same date, and this, with the transepts, has wagon-vaulting. The dome at the crossing is very noble. The vault of the nave, originally domed, is now more recent, and quadripartite in three bays.

The next day, notwithstanding an early start, so much ground had to be gone over that it was only by merely looking at Ventouse, the first object, and by denying themselves a visit to the fine Renaissance château of Larochefoucauld, that the members of the excursion had time to do justice to Celle Frouin (*Cellam Sancti Frontini*), one of the noblest churches which have been visited. This, however, is not of the Perigueux type, but of an older Romanesque. The crossing has a domical vault, but very far from being spherical, as it springs from slightly cut-off corners supported by squinches. The rest of the vaults are wagon-vaults. The nave has aisles remarkably narrow and lofty. The semi-circular wagon-vaults have their springing several feet above that of the nave. The enormous size of the capitals (the bases are covered from the floor having been raised), and the massiveness of the piers are the most striking features. The finest architecture is that of the choir, nearly of the same date, *i.e.*, about 1040—1050. The cornice is supported directly by tall shafts and corbels, without the intervention of an arcade. This applies also to the small apses of the transept. At Larouchefoucauld, a small desecrated church was visited, St. Florin's, of which the foundation date is known,—1060,—so that this gives a valuable limiting date to the architecture, and this is distinctly Romanesque, of a lighter character, however, than Celle Frouin.

In the evening was the final dinner of the excursion, which had been originally proposed for Saturday, but was altered to secure a better attendance of members, many of whom wished to return to Paris by a mid-day train, after visiting St. Amand de Boixe.

Mr. Quilter, the president of the Architectural Association, proposed Mr. Sharpe's health, who, in reply, signified his extreme satisfaction with the self-sacrificing co-operation of the different members, and the results obtained. The prosperity of the Association, and of the excursions in future, was proposed by Mr. Penrose. The health of the president of the Association, and well-merited thanks to the secretaries, were also proposed, and it need scarcely be added cordially received.

The members rejoined one another at half-past five o'clock on Saturday, and proceeded to St. Amand de Boixe, which, indeed, may be truly called the gem of the whole district visited. Much repair is, unfortunately, needed, but not the restoration which is in contemplation for it as soon as the funds can be accorded for the purpose by the Government. There are considerable remains of the old abbey buildings (Benedictine), but the chief interest concentrates in the church. The transepts are ruinous, and the choir has been rebuilt late in the thirteenth century. The nave and central dome are of noble proportions. A very frequent circumstance in the churches of this district, and which occurs here, is for the west entrance to be raised considerably above the floor of the nave, so that there is a descent into the nave by a flight of steps. This is always broad, sometimes the whole width of the nave. At St. Amand, the nave has aisles, and consists of five bays and a half, and has wagon vaulting. The aisles are very narrow, and also have wagon vaults. The half bay referred to, and which is next the crossing, is almost solid, and is pierced only by one narrow arch, of which the sill is very high above the floor, and could have served for no purpose of communication. Mr. Sharpe explained the peculiarity thus (and there are other examples):—The church was commenced from the east end, and the first effort included the crossing and transepts, leaving out the nave. But the arches when built would require abutment from the west; accordingly this massive pier formed part of the constructive design, and when the nave was added it was not in this case thought necessary, or perhaps not desirable, to meddle with it. Over the crossing there is a vertical story or drum arcaded and pierced for windows. The original dome has been rebuilt, and it now is Gothic, with six ribs. The church is said to have been consecrated in A.D. 1170, and the beautiful early architecture which remains, and which is inferior to none in beauty of form and grace of detail, belongs probably to the middle of the twelfth century. With St. Amand de Boixe ended the excursion of 1875. Mr. Sharpe hopes to be able to collect the results as he did those of last year's excursion, but it will probably be the month of May next before this can be done.

LIGHTNING CONDUCTORS.

THE subjoined "Instructions" have been framed by a committee appointed by the Prefect of the Seine to consider the best method of protecting the municipal buildings in Paris against damage by lightning.

I. *Points of Lightning Conductors.*—A rod, serving as a lightning-conductor, rises in the air to a certain height above the building it is designed to protect. Whatever may be the protective power of the point, the latter should have volume and conductibility sufficient to enable it to withstand a disruptive discharge. It should be formed of some good conducting metal.

The committee consider that platinum points are useless, and recommend that every lightning-rod should be tipped with an arrow-head of pure red copper, about fifty centimètres (20 in.) in length, the edges forming angles of 15 deg. with the vertical, so that the point terminates in an angle of 30 deg. The arrow-head should be screwed on, bolted with screws, and soldered to the end of the iron lightning-rod.

II. *Rods for Lightning Conductors.*—The rod should be of wrought-iron, in a single length, and polygonal or slightly conical. If possible, it should be galvanised with zinc, but on no account whatever should it be painted. The connexion between the rod and the conductor should be formed by a piece of metal, carefully fitted and bolted to the ends, and the joints overlaid with a thick covering of tin solder.

III. *Definition of Protective Zone of each Rod.*—The committee admit that, under ordinary circumstances, a rod will effectually protect a cone of revolution, of which the apex is the point of the rod, and the radius of the base a distance

equal to the height of the said rod above the ridge, multiplied by 1·75. Thus, a rod rising 8 mètres above the ridge of a building would effectually protect a cone-shaped space, the base of which, at the level of the ridge, has a radius of 8 × 1·75 = 14 mètres. In practice, wider limits may be allowed if a "ridge-circuit" (*circuit des faites*) be used as recommended by the Academy of Sciences.

A "ridge-circuit" is a metallic connexion running uninterruptedly along the ridges of all the buildings to be protected and connected metalically with all the lightning-rods thereupon and with the conductors, and, consequently, with the subterranean sheet of water forming the common reservoir.

A ridge-circuit is formed of lengths of square iron rod, of about 2 centimètres (·8 in.) side, fastened together by overlaying the ends, bolting them together with a couple of bolts, and covering well with tin solder. A new branch is formed with a T-shaped connexion, the cross-piece of the T overlaying the original ridge-piece, and the stem making the first length of the new branch. In some cases the ridge-circuit rests directly on the ridge; but as it is of paramount importance that the joints and soldering should not be injured during repairs to the roof or in other ways, it will generally be found best to raise it to a certain height above the ridge, on supports at suitable distances.

The shape and arrangement of the supports will depend on the description of roof. Sometimes uprights are used, which should be fork-shaped, to allow of dilatation, without leaving room for undue lateral displacement; sometimes simple cast-iron bearings, weighing 10 lb. or 12 lb. each, are laid on the ridge, their upper surfaces being grooved to receive the bars.

IV. *Masses of Metal connected with the Conductor.*—All pieces of metal of any size employed in the construction of a building should have a metallic connexion with the lightning-conductors.

In the municipal buildings under consideration, the system of leaden gutterings is so complete and perfect that it may be regarded as a continuous whole; in this case it is merely requisite to establish some good connexions between the guttering and the ridge-circuit. These connexions may be made with pieces of strong plate-iron, or with strips of iron, of not less than 1 square centimètre in section, provided that the portions actually in contact with the ridge-circuit are not less than 20 to 25 square centimètres in extent. When the roof includes other metal surfaces, these should be combined into one by soldering strips of iron from piece to piece, and connecting them directly, or indirectly, through the guttering, with the ridge-circuit.

V. *Conductors.*—If the conductor is formed of solid iron bars, these should be galvanised, the lengths well fitted and bolted together at the ends, and the joints well covered with solder. If they cannot be galvanised, the rods may be given a good coat of paint.

VI. *Dilatation Compensators.*—The committee recommend the use on ridges of dilatation compensators, on the principle recommended by the Academy of Sciences. The rate of dilatation of iron is about 1 millimètre per mètre for a difference of temperature of 80 degrees centigrade. Now, in Paris, the temperature sometimes rises in summer to 60 degrees above the zero centigrade, and in winter sometimes falls 20 degree below it. We have thus a difference of 80 degrees, involving a variation of length equal to 1 decimètre (3 ft. 9 in.) in every 100 mètres of rods. In cases where the amount of expansion and contraction is likely to affect injuriously any portion of the structure, of which the architect will be the best judge, the "compensator" can be used.

It consists of a rod of red copper, 2 centimètres (·8 in.) wide, 5 millimètres (one-tenth of an inch) thick, and 70 centimètres (2 ft. 3 in.) long, bent in the form of a ⊂, and soldered to flat iron ends, by which it is attached to the bars it connects. When these lengthen, the branches of the U are pressed nearer together; when they contract, the branches are drawn wider apart; and so the dilatation or contraction, as the case may be, is compensated.

When galvanised iron wire-rope is substituted for the rods, the wires should be without breaks, annealed, and well galvanised, not less than 2·5 to 3 millimètres (one-twelfth to one-tenth of an inch) in diameter, and in number sufficient to give a section of rope equal to that of a square rod of 20 millimètres side, plus one-fifth.

VII. *Supports for Conductors.*—Supports for conductors should be as few in number as possible; forked for rods and ringed for wire-rope, and not isolated.

VIII. *Earth Connexion.*—The extremity of the conductor enters the ground after passing through a collar of wood or metal. To its extremity should be soldered a plate or hollow cylinder of metal, of the largest dimensions practicable, which should have at least 3 ft. of ground-water over it, even in the driest seasons. When the wells already existing cannot be utilised for this purpose, the ground-water may be reached at a suitable depth by boring and inserting metal tubing. When the ground-water cannot be conveniently reached, but a water-main is at hand, the conductor may be connected with the latter, taking care to make a secure joint, well overlaid with solder, with the metal of the main.

Where no connexion can be established either with the ground-water of the wells or by boring, or with a water-main, the idea of setting up a conductor should be abandoned, as the latter, in place of being of any service, will rather be a source of danger.

IX. *General Arrangements.*—In the case of a monument of any importance, two or more separate conductors should be established, communicating with the ground-water, the common recipient. Man-holes should be established, so that the subterranean portions of the conductors may be inspected from time to time. The latter should be arranged so as to be easily removable for examination, or repair and removal of rust.

X. *Inspection of Lightning Conductors.*—The committee recommend that a careful inspection of all lightning-conductors should be made once every year, at the end of autumn, and that some uniform method of testing their electric powers should be adopted.

Whenever a conductor is erected or repaired, its power should be tested and duly entered in a register kept for the purpose, in which should also be recorded the results of all subsequent annual inspections.

XI. *Employment of Special Workmen, &c.*—The committee recommend that the erection and maintenance of lightning-conductors should be entrusted to particular makers and special workmen, and not left to the contractors who ordinarily undertake the keeping in repair of public buildings.

XII. *Permanence of Committee.*—The committee further consider that it would be useful to keep up a permanent commission, which should meet annually, after the inspection, to report results, and to make arrangements for obviating any defects or difficulties that may have come to notice.

THE NEW INDIAN TARIFF.

THE Indian Government have passed the Indian Tariff Act, 1875, and by it several important changes have already come into operation in the Customs Tariff, with which it is as well that home contractors should be acquainted. Export duties are abolished on all articles except indigo, paddy, and rice, and in the case of imports a uniform reduction has been made from 7½ to 5 per cent. Among the alterations on metals the following may be of interest to the trade:—Angle and T iron, beams, pillars, and other descriptions of iron imported exclusively for building purposes are now charged an *ad valorem* duty of 1 per cent., as are also iron pipes and tubes. Nails, rose, clasp, and flat-headed rivets and washers pay 12 rupees 8 annas per cwt.; other descriptions, including galvanised, 1 per cent. *ad valorem*. Hoop, plate, and sheet-iron is taxed 135 rupees, and flat, square, and bolt iron, including Scotch, 100 rupees per ton. Galvanised iron, either in sheets or ridging, pays 11 rupees per cwt., while Swedish iron is charged 160 rupees per ton. Tin nails are subject to 14 rupees per cwt.; tin plate and other shapes, soft, 15 rupees per cwt.; sheet and zinc sheathing, 17 rupees per cwt.; and all other sorts 5 per cent. *ad valorem*. Tinned pipes pay also 5 per cent. *ad valorem*, while patent and yellow metals, sheathing sheets, and bolts are charged 42 rupees per cwt. Brass sheets, rolls, very thin, are taxed 90 rupees per cwt.; brass wire, 8 annas per lb.; and all other sorts of trade brass-work 5 per cent. *ad valorem*. Bolt copper is charged 50 rupees per cwt.; brasiers', 52 rupees; copper nails and composition nails, 48 rupees; copper sheet, sheathing, and plate, 52 rupees per cwt.; and copper wire, 10 annas per lb. European gold-leaf pays 3 rupees per 100 leaves, and mock gold-leaf 5 rupees per 20 books.

FIVE LITTLE GIRLS BUILDING A CHAPEL.

FIVE little girls, Mary Holdsworth, Sarah Ann Hudson, Fanny Lister, Elizabeth Watmough, and Eliza Fox, are the promoters of a novelty in the mode of procuring funds to build a chapel.

At Great Horton, a place of worship being much needed, some of the inhabitants commenced erecting a chapel on credit, and the five named little girls, considering that the builder should be paid, went quietly to work in making dolls' dresses and sundry little articles. Last week the young ladies opened a bazaar in the public street, which, from its novelty, attracted great attention, and before evening set in the stock was disposed of, and realised 4*l.*, which they handed over to the builder, in part liquidation of his account.

It is stated that the ages of the little ladies average from six to nine years, and that the idea is entirely their own; unless they happened to get it from a pretty story by Mrs. Mackarness, which tells how one little girl did the same thing, and to which we referred when it first appeared.

CHEAP FIRE-PROOF DWELLINGS: AMERICA.

MR. SYDNEY MYERS nearly a year ago offered a prize of 1,000 dollars for the best plans for an approximately fire-proof dwelling. On the 1st of February last the award was made, after careful examination by the committee appointed for the purpose, to Mr. A. J. Smith, of Chicago. After the award, Mr. Myers proceeded to erect certain dwellings according to the plans, and under the direction of the fortunate architect, Mr. Smith. The building selected for the test contained "representative" furniture, "made of pine, equivalent to that in the furnished house, besides which the floors were thickly strewn with shavings, and the further to facilitate a rapid and intense heat, the windows were left open, furnishing a perfect draught of air through the building. We quote from the report:—

> The fire was started at five o'clock, and, after it had nearly burned itself out, water was introduced by Fire Marshal Benner, and thrown against the walls and ceilings from an engine, to ascertain the effect of water thrown on the material when heated. The result of this test was most gratifying to your committee, satisfying them that the building was, indeed, all that had been claimed for it, and entitling Mr. Smith to the full benefit of the award. Both these sections were subjected to an intense heat for three-fourths of an hour, when water was applied, and they were found to be in apparently as good condition as before the test. In conclu ion, we repeat that the test was in every manner satisfactory to us, as fully conforming to the requirements contained in your circular. We cannot close this report without expressing our appreciation of the great work you have accomplished in demonstrating, not only to Chicago, but to the whole country, that good, pleasant, and indestructible houses can be constructed at a moderate cost, and we hope soon to see them replace the unsightly, unhealthy, and unsafe buildings so much in use at this time.

The houses to which the test was applied are situated on Sacramento-avenue; include two stories and basement; have stone front steps and stone steps to basement; hollow brick walls; all partitions are of brick or concrete, and all timbers perfectly protected with the same materials; window-sills of stone, and window-caps of terra-cotta. They are complete in all their details, containing gas and water pipes, sinks, bath-tub, &c., and the cost is only about 2,000 dollars. They are for sale, with land, at 3,000 dollars each.

Sawdust for Garden Walks. — A correspondent of the *Gardeners' Chronicle* says that in the extensive wild garden adjoining the well-kept pleasure-grounds at Cadland, near Southampton, the gardener, Mr. Harnett, has used sawdust as a dressing for the pathways cut out among the heath and trees in the woodland. The walks are firm and yet soft to the tread; the sawdust soon becomes of a neutral tint, closely allied to the crushed dried leafage of the beech, which so much abounds in the neighbourhood. Weeds seldom grow, and these are easily kept in check with the hoe, and a light sweeping with a broom keeps all clean and neat. No doubt the turpentine, found so abundantly in the wood of the pine-tribe, proves a great deterrent to weed growth.

THE THERMÆ OF IMPERIAL ROME AND THE BATHS OF LONDON.

THERE is a wide difference, it is certain, between antique Rome in the days of the Cæsars, and our modern London of to-day; but there are as well a good many things common to them both, more perhaps than many might like to allow. In not a few things we are many centuries indeed in advance of the antique Roman, but in some, quite obvious things too, we are immeasurably behind him. "Civilisation" is a common enough word, but it remains yet to accurately define it, and to say with precision in what it truly consists. Cities, be it observed, are not built up for mere effect, but to house and provide for a vast multitude, and the question may very fairly be put,—as to which of the two cities, modern London or ancient Rome, did this most effectually. We might go into not a little detail, and take things one after another, but will now confine our thoughts to those famous baths, or "thermæ," for which the old Romans were so famous. We say baths, but in connexion with them there were many other things, and many other wants supplied, which might startle a modern Londoner even to name,—wants both bodily and mental. Did we seek for a contrast we might well ponder over the long list of things provided for in the antique "baths," and the bodily and mental wants attended to, and the art to be seen in them, with our small doings in the way of baths and swimming gear. Whatever may have been or is done for the physical frame, no one can complain of the expenditure for mental wants and luxuries, or for fine-art display. And we have seen every bath in this huge metropolis.

Of the magnificent antique baths or "thermæ" of the Romans what can be said? All things are improving, as we are told, on all hands, but baths or thermæ are not. In the imperfect remains of the great thermæ of the Romans, we get some insight into the vast extent, and artistic and architectural character of things. During the Empire the daily bath became a necessary of life, and it became thence a necessity to make it sufficiently luxurious and attractive. It may be noted that unlike our expensive baths a *quadrans* only, about half a farthing, was the price of admission. We are specially thinking now of the more magnificent of the Roman baths, such as those of Caracalla and Diocletian, and which form, in remembrance at least, such a contrast to our efforts at thermæ building. These contained within their vast extent gardens, colonnades, halls, a library, and courts or spaces for a variety of *athletic* sports. These piles of buildings were not baths only, and the point especially to be noted, and we call especial attention to it, is the fact of the artistic element being always in all these establishments considered a prime necessity, and that not *externally* only, but *internally* as well. The old Roman would as soon have left out the *water* itself as his statues and his architectural accessories. And the great question then comes—with not a few others by the way that occur to us—how far and to what extent is fine art in such a place as a swimming-bath a necessity? To the old Roman it most certainly was a necessity, for he never neglected it. Are we better or wiser than the antique Roman in the leaving all this out of our "thermæ"?

But the old Roman, it must be observed, was not satisfied with the merely providing a large tank filled with tepid water to swim in, with, in addition, all the necessary requirements, so many in number, that the curious in such matters have not been as yet able to catalogue all of them; but he went much further, and manifested a comprehensive knowledge of the physical frame of man, which might well shame even our own advanced and more scientific knowledge of it. What did he then do? After providing a suitable and really architectural and artistic tank of water,—a fine-art bath,—why he added to it, in a closely adjoining chamber, a gymnasium, with all needful apparatus, doubtless, for gymnastic and healthful bodily exercises. It would be difficult indeed to see now how anything could be better or more appropriate. The bath had provided for cleanliness; he next considered that nothing conduced so much to health as exercise, so that these great bathing and swimming establishments were always supplemented by an added gymnasium. No such thing has since been thought of, and one question for the future of such matters will doubtless be this addition to the swimming-bath. Gymnasia there are, as it is, as all probably know, every here and there attached to public and other schools. There is one at Westminster, but full to overflowing with all kinds of complicated apparatus. A public, or rather semi-public, one there is, and the only one we believe, to which the public can be said to have access in London city. But all these, wherever they are, bear no possible resemblance to the magnificent Roman architectural buildings.

But the old Roman did not stop even here. He added a garden to his bath apparatus, wherein doubtless might be seen rare and costly flowers, and things which a garden can alone show. It was certainly a happy idea of his, and well enough might it be imitated now-a-days; or rather might there not be a bath worthy of the name in each of our so costly public parks? Let us here note a fact connected with the swimmer's art not always borne in mind even by those who are adepts, viz., that no *covered-in* bath is like an open-air one, and it would seem a pity, indeed, that there are none such. We speak of regularly constructed baths of suitable materials, and accessible at all hours during the summer months, and, indeed, for that matter, all the year round, for nothing stops the confirmed and enthusiastic swimmer! We may learn much from the old Romans yet.

Thus have we swimming and other baths of divers kinds, gymnasia, and a garden, all together; but there was yet more than these included in those imperial establishments. There was also provision made always for spectators and keen critics of the sports; and prizes were instituted for the encouragement of them,—everything, indeed, we are told, which could minister to the comfort or amusement of visitors of all ranks and tastes. A library, also, was attached, filled, doubtless, with books on science, philosophy, and poetry. Halls, too, and colonnades were provided, in and under which these books were read, especially the immortal poets of the then present and past time.

It is instructive to observe, too, that the antique Greek, so glorious in historic and artistic renown, did not look on such arts as those of swimming and gymnastics as mere ways of passing time, or as simple amusements, to be done or not done as the caprice of the moment or the taste of the individual dictated, as we now do, but he came to the firm conviction, or his medical advisers did for him, that such exercises were absolutely necessary for health. And, more than this, that no sound and healthy mental action could be expected but from a sound and healthy physical frame. And that the gymnasium and the bath were necessary to this. Again, and ever again, are we met by this dictum through the writings so happily preserved of the Greek and Latin authors. These men wrote simply of what they saw around them, and in them, and from the remains of the ancient thermæ may be gathered with some considerable clearness all that existed or was thought necessary in the ancient baths. So completely do they seem to have considered the problem before them, and so well they did their work, that better models generally to go by there can hardly be. Swimming became in their estimation a fine art, and all that helped to it was alike artistic. And not only was this for the actors themselves, but it was thought necessary to provide for those who were mere lookers on, as on a racecourse, and this was thought to be, as it centainly was, "educational." The great artists and sculptors of the time could not have done their superlative work without some such help.

Our main object is here to show as far as possible how much there is to be done towards a due encouragement of the swimmer's art. Nothing certainly can be urged against swimming—everything is in its favour; it conduces alike to health, cleanliness, strength, grace of movement, and suppleness of body, and all these in a way that can hardly be duly appreciated by any but those who have, even as things are, already "taken to it." The Romans understood all this right well. We have yet to learn it, and before, perhaps, much can be attempted in imitation of the Roman, or the Greek, a feeling or a "prejudice," if you will, must arise to demand action in such direction. We would here earnestly plead for it, on all and every ground. If the Aquarium, now so popular, can be built up almost regardless of cost, with every furtherance, and with no small additions of architectural costliness, then may we plead for some such liberality for swimming apparatus and thermæ architecture. Let us, however, by all means, begin with the fish, and look at and admire their movements in the water, and nothing can be better by the way; but let it not stop there: let the human being be thought of, too. He, too, is of the water as well as the land. We venture to name this as showing how very much the same is man all the world over and in every age, the movements and forms of animal life never failing to interest. The "shows" of the antique world, barbarous as they were, were not wholly evil.

Looked at æsthetically, it would be difficult indeed to over-estimate the beauty of the swimmer's art. The more easy and graceful the action, the finer the muscular action, the nobler becomes the art of it. All the great "idealities" of art—to use that somewhat vague, but still not a little expressive term—are elicited. There is nothing else for it. Quickness and ease of movement through the powerfully-resisting water compel and necessitate grace of movement. Had we more swimming-baths in this huge London, and baths worthy to compete in goodness and costliness of material and in architectural display with those of old Imperial Rome, then, doubtless, all this, and a great deal more, would have been noticed by artists, and sculptors especially; and we should then have had every now and then, as opportunity offered, sculptured, if not painted, representations of it. It is worth noting here, for some confusion of thought has come of it, that such common adjectives as "graceful" always imply an object, and that, consequently, the aim of the executive artist, in whatever material he may work, is to catch that momentary grace which will manifest and make itself visible in those forms and movements which he sees around him, and which, after all, are the sources of his inspiration. The artist sees this intuitively, and with greater vividness than others. It would be, indeed, very difficult to find this grace of movement more strikingly displayed than in the movements of a fine swimmer. It is a many-sided problem, but certainly an artistic one.

UNDER LONDON DOCKS.

THE difficulties that the East London Railway Company have had to encounter, and which they have now happily surmounted all but completely, have been of a more than ordinarily embarrassing and imposing character, and of more than one class, embracing, if we mistake not, obstructions legal and diplomatic, physical and financial. They are now getting to the light at the end of the vista, the heaviest of the works on the north bank of the Thames, including a passage under one of the basins of the London Docks, being now practically completed.

One of the heaviest works on the line—Brunel's famous Thames Tunnel, of 1,300 ft. long,—was really opened, although not for railway purposes, on the 25th of March, 1843. In 1863 a select committee of the House of Lords on Metropolitan Railway communication reported in favour of the construction of the East London line, as part of an outer circle of railway communication within the Metropolitan District. In the year 1865 the company obtained their Act of Corporation for the construction of a line of about eight miles in all, to form a junction with the Great Eastern Railway at or near Shoreditch to pass thence, principally in tunnel, under the docks at Wapping, and through the Thames Tunnel to Rotherhithe, thence to junctions with the London and Brighton and the South-Eastern railways at their respective stations at Newcross. In December, 1869, the line was opened from the north end of the Thames Tunnel at Wapping to a junction with the Brighton line at Newcross. Other junctions with the lines on the south side are almost complete, and, as already stated, the heavy works between the Wapping shaft and the junction with the Great Eastern are in a very advanced state.

The curves and gradients are favourable, the quickest of the one being on a radius of fifteen chains, and the sharpest of the other a short length of one in sixty. The road is level under the docks, and then rises for a short length to Shadwell Station. The rails are to be double-headed, and of steel, weighing 75 lb. to the yard.

As may be readily supposed, the heavy works on the north side commenced from the Wapping shaft. These are completed, including the covered way under the dock basin, excepting only a short connexion that remains to be excavated to connect the portions of finished way; which are of pretty much the same character as the works of the Thames Tunnel, separate "up" and "down" lines, with a 4 ft. 6 in. wall between. The arches are of the ordinary horseshoe

shape, built with seven rings of brick, and are surrounded with 3 ft. of puddled clay. They have also inverts of brick or concrete. The height of the arches from the rail level to the crown of the arch is 20 ft., and the greatest width 25 ft. In the deep excavations at Wapping 20 ft. of made ground had to be taken up, then 18 ft. of gravel, before the London clay was reached. This contained numerous quicksand pot-holes that caused the engineer much trouble.

The property required for the railway between the river and the dock basin was of an inferior character, and a good deal of it was swept away to the improvement of the locality. The most important work here was the underpinning of the workhouse of St. George's-in-the-East. The other important works in underpinning are of one of the London Dock warehouses, and of the piers under it, of the groined arches forming the rum vaults, which were carried down to the level of the railway foundations. Further on the foundations of the Blackwall Railway viaduct were carried down to the London clay to 50 ft. below the original depth. The preliminary underpinning operations delayed the execution of the other works; but all that remains unfinished now is in active progress. Proceeding northwards from Shadwell station, of which two-thirds of the station works are done, the covered way is nearly all completed to about 50 ft. north of Commercial-road. Between this point and Whitechapel-road the contractors are working at six different points in a short distance of 700 yards.

The retaining walls for the Whitechapel station are nearly completed, and scarcely anything remains to be done but the station. There will be a goods station here on the north side of the main thoroughfare, where the rail level is as near the surface as it can be without altering thr levels of important thoroughfares. There will be a goods station at Shadwell also. Between Whitechapel station and the junction with the Great Eastern Railway at Brick-lane, the navvies are at work at five different points. The works here are comparatively light, and there will be no difficulty in completing them within the same time as the works between Wapping and Whitechapel will occupy.

The most interesting engineering exploit on the section is the covered way under the London Dock eastern basin. Operations were carried on, in the first instance, from the surface, and consisted in dredging trenches in the bottom of the dock until the London clay was reached. The next process was the driving of the piles, clean-squared, and driven as closely jointed as possible. These are of about 14 in. on the side, and about a minimum of 40 ft. long. Fourteen steam pile-drivers were employed in sending them home. There are two rows of coupled piles outwards towards the dock, and one row on the inside towards the railway works. These, placed at 4 ft. 6 in. apart inside, and the clay-puddle hard-rammed between the two wooden walls, are the coffer-dams for the protection of the workmen in constructing the covered way under the dock basin.

In addition to the pine forest laid under contribution to provide the piles, another and larger must have been felled and cleared to provide the enormous quantity of timber used in the internal timbering and staging fixed longitudinally, laterally, and with upright supports at the intersections, the spaces between at very short distances. Some idea of the resistant powers that had to be provided in the construction of the works, as well as for their enduring power, may be formed from the statement that the ordinary depth of water in the dock is 21 ft.; under this is a bed of 3 ft. of clay puddle, followed by 4 ft. 6 in. of brick-work, being the crown of the arch, under which is the covered way, of about 15 ft. clear headway under the dock. In one part of the basin the water communication between one side and the other, and over the railway, has been restored, and one day recently the curious sight presented itself of several large merchantships,—the *Raby Castle* and the *Victoria*, of London, among others,—lying berthed immediately over the railway, and the large first-class clipper *Lady Macdonald*, outward bound, crossing over it at right angles.

In the construction of these exceptionally heavy works at such low levels, of 50 ft. to 60 ft. below Trinity datum line, powerful mechanical appliances have been necessary, that have included twelve pumping-engines, working night and day; three of these, of 56-horse power nominal, employed at the London Docks, are equal to lifting 50 ft., 8,000 gallons per minute. The whole of the water pumped is from the Thames, or from springs, not a drop percolating from the docks through the finished works. A large number of powerful steam cranes have also been employed for lifting the excavated earth from the workings. Recently a million of bricks have been used, and 600 tons of Portland cement per week, besides a large quantity of blue lias lime. The large quantity of puddle-clay required for the works has been brought to the ground in barges, much of it from the neighbourhood of Rochester. The London clay is totally unsuited for puddling.

The engineering works of the East London line have been designed by Sir John Hawkshaw, as engineer-in-chief, Mr. W. Hunt superintending the execution of the works as resident engineer. The most serious mishap that has occurred since the works were commenced was in connexion with the first dock coffer-dam. Delay in finishing the line, and the loss of human life and of money, would have been prevented, it is believed, if the plans for these works of Sir John Hawkshaw had not been unwisely interfered with. Mr. Thomas is the contractor.

The completion of the East London Railway will supply the missing link in the connexion between railways separated by the Thames, and must greatly facilitate intercourse between Middlesex and Essex, and Kent, Surrey, and Sussex; it will give a stimulus to building operations; it will afford the shortest and the only unbroken route for minerals and merchandise between the northern and southern counties and the southern shipping ports, saving, in addition to the advantage of continuity, five miles in distance. It will have no opposition to encounter either from rival lines, steamboats, tramways, or omnibuses, to which other metropolitan lines have to submit. It will also command a larger proportion of through goods and passenger traffic than the lines referred to. It seems likely to secure a considerable traffic from the Foreign Cattle Market at Deptford, and of timber trade from the Commercial Docks, by a short branch running into these docks. It will also have a siding and station at the London Docks, from which merchandise may be carried to and from all parts of the United Kingdom without transhipment. It will furnish the shortest route to the densely-populous districts in the east of London for the Crystal Palace, Hastings, Eastbourne, Brighton, and good routes to Ramsgate, Margate, and Dover.

Costly although the East London line has been,—500,000*l.* per mile,—its cost is much lower than that of other metropolitan lines, some of which have cost from 850,000*l.* to more than 1,000,000*l.* per mile. The average distance travelled by the passengers on these lines, such as the Metropolitan, the Metropolitan District, and the Charing-cross, is not more, probably, than a mile and a half, whereas on the East London line the average distance travelled is unlikely to be less than four miles. The East London will be worked by the Brighton Company under agreement.

SILK CULTURE AND WORK FOR WOMEN.

EARNEST and successful efforts are being made in Australia to cultivate mulberry-trees and silk-worms, and a company, in which a *man* cannot be a director, has been established in the diocese of Goulburn for these purposes, with very remarkable results. Aid is needed to give the institution national proportions, and Mrs. Bladen Neill, to whom much of the success attained is due, is now in England to make their wants known.

Mrs. Neill writes,—"For the production of good grain (eggs), many parts of England would be suitable; but as to silk, the millions of acres of land in our colonies will certainly, some day, yield the finest in the world. In California we hear also of large tracts of country having been planted with mulberries, and that the Californians have commenced manufacturing as well as reeling their own silk. M. Bonhomme, the manager of the Sonoma Sericicultural Association, California, confirms all I had heard in Italy. The Californian grain is in great request in many parts of Italy, and the price varies from 25 to 40 francs per ounce,—not in dozens, but in hundreds of ounces. If, as he says, and I believe it is perfectly true, Italy requires 3,000,000 ounces annually of grain, what may not be the work provided for our women and girls, seeing that Japan and China, now the only two grain-producing countries in the world, might at any moment fail to supply the market, disease having shown itself in both countries, if large plantations of mulberries are made in Australia, other British colonies, and California? M. Bonhomme has been a grainer over sixteen years, has visited all parts of Asia and Europe in search of healthy grain. The result of his experience is that it is to the new countries and their virgin soils the old world must look for assistance in its old age, and thus make happy all the children who can and are willing to help their parents. May our colonial women show as much energy in the cultivation of silk as the men did in wool, and we shall soon see a trade the limits of which it is impossible to foretell."

Sir James Fergusson, the Governor of South Australia, took considerable interest in the cultivation of the silkworm, and sent them some very good specimens of the Japanese race; but it was to Mr. Charles Brady, of Sydney, the brother of Sir Antonio Brady, that they were indebted for the preservation of some of those wonderful old races of silkworms now all but extinct in Europe. For years he has been educating some of the finest races procured from France by his sister, before the disease became universal. Some years previously M. Roland had done the same in Switzerland. It is a curious fact that both regenerated their race of worms,—the one by the snows of the Alps, the other by the heat of an Australian sun. Mr. Brady, the most energetic pioneer of sericiculture in Australia, had previously ransacked the world for all the best-known species of silkworms, with a view to testing the relative value of the different kinds from a commercial point of view, the one idea of his life being to successfully initiate the cultivation of the best varieties of this, the most valuable and profitable to man of all the insect tribe, and which with care will become second only to wool.

Mrs. Neill says:—"From Mr. Brady I obtained a small sample of grain (eggs),—the cocoons from which, when shown to experts in Lyons, elicited a demand for all we could produce of that quality at the highest market-price. This was great encouragement, and I determined to visit the silk-growing countries of Europe and to judge for myself as to the supposed superiority of the Japanese races, then all but universally imported into France and Italy. From Naples, Ancona, Venice, thence through the Italian Lake districts to Milan, Florence, Cuneo, Novi, Genoa, and on through Nice to Marseilles, Montpellier, Cavaillon, Cevennes, and the Ardeche; everywhere I met disease,—the same sad story, small cocoons, and little profit to the poor peasants. At one railway station the country people refused to believe the cocoons I had could have been produced the previous year, as they said they had seen none such for twenty years. A mere accident brought to my notice a grain that had been most carefully educated for years in the little old-fashioned Roman town of Orbe, Switzerland. It was there that a pupil of Chavennes had pursued his master's system; he went still further, for he hatched out the grain *on* the tree, allowed the worms to feed naturally in the open air under muslin or canvas covers to preserve them from enemies, to cocoon, and, finally, the moths to lay their eggs. Of course, none but the strongest lived to propagate their species. The grain remained on the tree exposed to the frosts and snows of an Alpine winter, thus regenerating, as he calls it, the race, and, after three years, rendering it as strong as the stock from which they were originally obtained,—namely, that from the north of China."

A letter from the Bishop of Goulburn to Mrs. Neill, in which his lordship says,—"I very gladly bear my hearty testimony in behalf of your most important mission. Having visited, and been delighted with your establishment for sericiculture at Corowa, in the diocese of Goulburn, and being aware of the self-denial, ability, and devotedness with which you are conducting and striving to extend this interesting enterprise for the benefit of the British colonies, I shall rejoice in your complete success,"—a number of other testimonials, and our personal observations, enable us to commend Mrs. Neill and her mission to all who feel interested in the twofold object in view. The address of the lady is 27, Princes-gardens, South Kensington. Aid at this moment will give another industry to our colonies which will afford suitable and profitable work for thousands of women.

By the way, are there any white-fruited mulberry-trees in England? If so, we should be glad to hear of them.

"PETTICOAT LANE."

YEARS ago Middlesex-street,—or, as it is more commonly called, Petticoat-lane,—was described in this journal, and its evil state from both a sanitary and social point of view commented on. Time has done little to improve it, and such of our readers as have had an opportunity to inspect lately this very "interesting" neighbourhood will agree with us when we say that it is a den of filth. Those who have not been there we strongly advise to still keep at a respectful distance, and in doing so congratulate themselves that it is not their duty to visit and report upon any of "our London slums."

Middlesex-street, Whitechapel-road, London, is, and has been for many years, the haunt of Jews; not that it should be any the worse for that, but it is a notable fact that Jews of a particular class strongly object to cleansing or in any way altering the appearance of their dwellings, consequently both the interior and exterior of the houses in Middlesex-street have a most dejected appearance. The doors of some of the houses appear to have suffered from an invasion of "lifters,"—in other words, they have neither hinges, bolts, nor bars. In the daytime they are placed "far from the madding crowd" to a very dignified position in the back yard, so as to give the occupants of the houses more room to exhibit their numerous miscellaneous articles. The windows of nearly every house are in a most deplorable condition; the frames are hacked and chopped about in a terrible manner, and when glass "is no more," rags, brown paper, and other sundries take its place. Upon our visiting one of the houses in Petticoat-lane, we went into a room upon the second floor, and were startled. The walls, save for an occasional clipping from some illustrated journal, were completely bare. They were exceedingly damp, and smelt strongly of naphtha or parafine. The ceiling was in a much worse condition. In each corner spiders had evidently been disporting themselves, for they had "spun yarns" large enough to satisfy the ideas of any wine-buyer. Upon our inquiry as to the rent, we were informed by one of the occupants, a handsome young Jewess, that it was "three-and-six, and long enough price, too!" to which an assenting and most emphatic grunt was given by the girl's father.

Upon either side of this lane are narrow courts, so narrow indeed that much difficulty would not be experienced in the inhabitants giving each other a "hearty greeting" from opposite houses, so close are they. The houses in these courts are, if anything, worse than in the lane, and smell horribly. The inhabitants might, if they thought proper, get rid of much of this, but they will not take the trouble. They allow heaps of rubbish, such as the refuse of green stuff, fish, and so on, to rest in little heaps all over the place. These are the cause of half the offensive effluvia; but, to add to this, the inhabitants are principally dealers in fried-fish, bacon, and onions, or old clothes. "The market," as the vendors of articles therein dare to call it, is a perfect masterpiece of disorder, the houses, shops, and stalls being all mixed up in a delightful state of confusion. In this place almost every description of old wearing-apparel is bought and sold, and the reader will be able to judge what the stench from this must be on a warm day. Such a place as Petticoat-lane is a disgrace to London, and the sooner the authorities decide upon pulling the whole down the better it will be for the health of its present inhabitants and those in the surrounding neighbourhood.

THE USE OF THE ELECTRIC LIGHT IN MANUFACTORIES, &c.

THERE is reason to believe that the problem of the application of the electric light for everyday purposes, in place of gas or other material for lighting, has been satisfactorily solved, though no doubt further experiments will be required to make the new light thoroughly useful. We see from a communication to the *Revue Industrielle* that the lighting by means of Gramme's electric-light machines has been introduced in the factory of Messrs. Heilmann, Ducommun, & Steinlen, of Mülhausen; and it is reported that their use has been attended with perfect success. In a separate room four magneto-electric machines have been set up, which supply four suitably-distributed lamps by Serrin. The space illuminated has a length of not quite 200 ft., and a breadth of about 100 ft. Each lamp has an illuminating power of about 100 Carcel's lamps, and is surrounded by frosted glass bells for tempering the glaring light. The charcoal points must be changed every three hours. The cost of the four lamps, exclusive of expenses for primary power, amounts to about one franc per hour. In the two months during which the new mode of lighting has been in operation, no defects have been noticed, and a beautiful and steady light has been supplied, the intensity of which has been attained by no other means of lighting. The magneto-electric machines cost 1,500 francs each; the total expenses for setting them up and for fittings amounting to only 8,000 francs (320*l.*).

According to Laboulaye's *Dictionnaire des Arts et Manufactures*, the light of 700 stearine candles costs per hour with—

Electric light, by a magneto-electric apparatus	0·10 to 0·20 fr.
Electric light, by means of a galvanic pile.....	3 to 5 fr.
Coal-gas.....	3·20 fr.
Petroleum.....	3·85 fr.
Rape-oil.....	6·10 fr.

In order to effect a uniform distribution of the electric light to different points, experiments have been made in which the same current was passed through several apparatus by means of "current turners," which, however, interrupt its passage through a lamp for such a short time only as to make the light produced appear continuous. This observation is based on the duration of the impression on the eye by light, which lasts at least one-tenth of a second. It has been proved by experiment with the lighting apparatus for alternate currents by Siemens and Halske (perfected of late by von Hefner-Alteneck) that the arc of light between the points of charcoal is restored again directly if the interruption of the current lasts only a short time. M. Leroux found in his experiments that an intercepted arc of light between the points of charcoal is restored at once if the interruption of the current does not last longer than one-twentieth of a second. He also divided the electric light by conducting the current of a Bunsen battery alternately to two apparatus, by means of a quickly revolving distributing cylinder, in such a manner that both lamps during the same time received the same number of electric currents. The two sources of light thus produced were perfectly equal. It appears, however, that this mode of dividing is neither practical nor economical, and it has consequently been tried to effect a division of the electric light by dispensing with the arc of light. Experiments made lately with this view, in which the light was divided into ten parts, also produced no favourable results, the expense being about the same as that with gas or petroleum. These failures caused M. Gramme to construct smaller lamps at first, of a power of fifty Carcel's lamps. They act very well; but the light they give is not perfectly steady. The machines now in use, however, have proved successful. They give a light of at least one hundred Carcel's lamps, and their cost, as already stated, is only 1,500f. each. Although with these machines the problem of the division of the electric light is by no means thoroughly solved, the latest improvements introduced, and the great saving effected, will perhaps further the employment of the electric light for lighting extensive manufactories, railway stations, and other large buildings.

MOVEMENT IN INDIA.

AMONG the other alterations which are being effected at Government House, Calcutta, in prospect of the visit of the Prince of Wales, the old throne is being replaced by an elegant structure, the drapery of which will be of the finest crimson velvet, trimmed with gold and emblazoned with the Royal Arms. Chandeliers, of the days of Cornwallis and Hastings, which have been in use till now have been forwarded to England by Messrs. Osler & Co. to be repaired and renovated. All the picture-frames are undergoing regilding, and the Department of Public Works, in addition to paving the whole of the lower portion of the southern flooring with fine marble, has received orders to furbish up the exterior of the building so that it may look its best. . . . Sir Madhava Rao has taken upon himself the task of organising a Public Works Department in the Baroda State. Mr. Hill, C.E., has been appointed chief engineer, and efforts are to be made to procure an efficient staff of subordinates. The Nazur Baugh palace, of which we lately gave a description, is to be furnished, and a sum of money is to be expended in purifying and draining the city, and in maintaining proper sanitary arrangements. It is also reported that the water of the Nurbudda is to be conveyed into the city for drinking purposes at a very large outlay. . . It appears from the resolution of the Government of Bengal, on the Administration Report of the Calcutta Municipality for 1874, that the future expenditure of the Municipality on both the new drainage system and the waterworks is likely to be much heavier than was anticipated. The outlay on the former during the year was 53,763*l.*, and the length of sewerage constructed 44,283 ft., or rather more than 83 miles. This, although fair progress for one year, leaves a great part of the native half of the town still undrained. Many streets in busy districts are flooded by every heavy shower, in consequence of the inefficiency of the drains to carry off the rainfall. To remedy this inconvenience, and enable traffic to be carried on at all times without interruption, supplementary works are to be constructed. These additions to the original scheme will cost a considerable sum above the estimate of Mr. Clark, the engineer. . . . . The Government project for supplying ten gallons of water per head to the population of Bangalore at an estimated cost of 57,000*l.* has met with the active approval of the Commander-in-Chief; but as the scheme will require time to mature and complete, it is likely that at his instigation a considerable outlay will be incurred in the construction of temporary works to supply the troops stationed there with pure water in the meantime. . . . . A well-known Mohammedan citizen of Bombay, Mr. Cummoo Sullimon, has conceived the idea of raising a sufficient sum of money to provide a garden for the sole use of native ladies, and hopes to raise 2,500*l.* from native gentlemen for its decoration, while he obtains from the Government a suitable site. Moreover, he is so sanguine that he hopes, with the assistance of the municipality, to carry out the work with such despatch as to secure its completion before the arrival of the Prince of Wales in Bombay. The local press supports the project, asserting that such a garden would be fully appreciated by native ladies, many of whom would be glad to go out for an airing in the evening, and are deterred only by the fear of exposing themselves to the public gaze.

BURMESE BUILDINGS.

THE Indian mail brings some interesting details about Mandalay and some of the other places which were visited by the members of Sir Douglas Forsyth's mission. Prominent among them is Akouktoung, on the Irrawaddy, which doubtless will attract the curious and provoke investigation, now that it is known, and the Burman king is at least disposed to be civil to Englishmen. Approaching the place from the south-east it appears to be on a high promontory running out into the river. The bluff is covered with images of Guadama and other deities out out of the solid rock. No village is visible, and passers by are left to conjecture the purpose for which this sanctuary was established. The name of the spot signifies "a place for the collection of customs," and with this indifferent explanation the inquisitive must at present be content. The city of Mandalay, in the centre of which stands the royal palace, is enclosed by a brick wall from 20 ft. to 30 ft. high, backed by a mud embankment. Attempts have apparently been made at forming bastions; but the results look more like half turrets. The whole enclosure is about a mile and a quarter square, and is surrounded by a moat about 40 yds. wide and 12 ft. deep, fed from a natural lake not far from the city. The best part of the town is within the walls, and the streets there are much better kept than those outside. Everything about the royal palace except the basement and floor is covered with gold-leaf; roof, columns and ceiling alike glittering in the bright sunshine. The throne is a wonderful contrivance, surrounded by peacocks' tails, with kneeling figures carved at the foot.

New Gasworks at Lincoln.—The tender of Messrs. Howard, of West Bromwich, amounting to 1,395*l.*, for the erection of an iron roof, &c., for the new retort-house now in course of erection at Bracebridge by the Lincoln Gas Light and Coke Company, has been accepted.

THE WATER-SUPPLY OF OLD LONDON.

THE GREAT CONDUIT IN CHEAPSIDE.

FITZSTEPHEN, in his description of London, which he wrote in the reign of Henry II., speaks of the springs, wells, and streams of the City, as being in his time "sweet, clear, and salubrious, 'mid glittering pebbles gliding playfully." Until the thirteenth century the inhabitants of London obtained their supply of water for domestic uses partly from these sources, and partly from the Thames. But early in this century, owing to the diminished yield of the springs and wells, and their tainted condition from surface and cesspool percolations, and to the impure state of the watercourses, from the erection of buildings upon their banks, and the discharge of slops and waste water into them, the mayor and citizens were compelled, as Stow writes, "to seek abroad for sweet water for the poor to drink, and the rich to dress their meat." This they found in the slopes upon which Hanover, Cavendish, Grosvenor, and Portman Squares, and the adjacent streets, now stand. Here the subsoil, which consists of thick beds of gravel, interspersed with layers of sand, resting upon the blue clay, was full of water. This was derived and maintained from the rainfall upon the district sinking through the surface into the gravel beds beneath. Out of these nine springs oozed at various places, and ran down the grassy slopes into the Tyebourne, which then flowed through the district from north to south, while Oxford-street passed through it from east to west.

In 1236 the owner of the land, Gilbert Sandford, at the request of the king, Henry III., granted the springs in perpetuity to the mayor and citizens of London. These the Corporation collected by lead pipes into a reservoir, which they constructed in the ground where Stratford-place, Oxford-street, now stands, and from the reservoir they laid a 6-in. lead pipe to the great conduit in Cheapside. The pipe was laid in a south-east direction, across the fields between Regent-street and Bond-street, to a point in Piccadilly, about midway between the Circus and the Geological Museum. From this point it was carried across the Haymarket and Leicester-fields to the King's Mews, which abutted on Hemming's-row, near Charing-cross. From thence it was continued along the Strand and Fleet-street, over Fleet Bridge, which then spanned the river Fleet, up Ludgate-hill, and along Cheapside, to the conduit, which was placed at the point between the Poultry and Bucklersbury.

The length of the pipe was 4,752 yards. As before stated, it was of lead, and 6 in. in diameter. The head or pressure from the surface of the water in the reservoir to the conduit-mouth was 20 ft. Assuming that the supply from the springs maintained this head in the reservoir, the delivery at the conduit was 97 gallons per minute. Assuming, also, that the pipe was ⅞-in. thick, its weight was 234½ tons. So well was the contour of the section of the line of the pipe chosen, that nowhere did it rise above the general or hydraulic line of inclination. Hence no pressure was lost, no vacuum places were formed, and the discharge was the same as if the inclination had been uniform throughout. It was provided with a kind of stop-cock at its head for storing water in the reservoir at night, and also with stop-cocks along its course, for shutting off the water for examinations and repairs. There was notably one stop-cock on each side of Fleet Bridge, where the pipe came out of the ground and passed over the bridge. Here it sometimes burst, probably from exposure to the frost. There is reason to believe that here, too, it was provided with an air-vessel and cock at the summit of the vertical bend, for discharging the air which, most likely, accumulated at this point. This work was the first of its kind executed in England that we have any knowledge of. Hitherto it has not been alluded to in any history of water-supply in England; but as it evinces eminent engineering skill, both in design and construction, it deserves high commendation. It would be interesting to discover whether it was the work of English or Dutch engineers.

Certain merchants of Holland provided the pipe, in consideration of being permitted to have establishments in the City for the sale of their goods, and to import them free from river-dues for a number of years. For the king's service in obtaining the grant for the springs, a hole of the size of a goosequill was allowed to be made in the pipe opposite the mews before-mentioned, for supplying it with water. Subsequently, a half-inch pipe was connected with the main in Fleet-street, near Shoe-lane, for supplying a conduit which the mayor and citizens set up there. As the inhabitants of the City depended upon this main-pipe for their supply of water, the Corporation never permitted any private person to meddle with it, or to take water from it. In 1478, however, one William Campion, who resided in Fleet-street, surreptitiously tapped the pipe, and conveyed the water into a well in his house, "thereby occasioning a lack of water to the inhabitants." For this offence he was imprisoned for a time, and then set upon a horse with a vessel of water like a conduit, having small pipes leading out of it, placed on his head. In this way he was taken round all the City conduits (the water running over him all the while), where the Mayor's proclamation of his misdemeanour was read. He was then marched back to prison to abide the further will of the Corporation.

For several generations sufficient water ran at the conduit for the wants of the people. Thence it was brought to their houses in "tankards," holding about three gallons, by a class of men called "water-carriers," who resided chiefly in Cob's-court, Broadway, Blackfriars. In his play of "Every Man in his Humour," Ben Jonson has a water-carrier named *Cob*, who says, "Give me my tankard. . . . . It's six o'clock: I should have carried two turns by this." But in course of time, as London grew in size and population, and the springs yielded less water than formerly, owing to the reduced rainfall from cutting down the great forest north, east, and west of the City, the water running at the conduit was insufficient for the requirements of the inhabitants. This caused the Corporation to bring other springs into the conduit-pipe from the manor of Paddington. In 1439 the Abbot of Westminster, to whom this manor then belonged, granted all the springs rising in it to the mayor and citizens of London, who then collected those on a suitable level into a reservoir at Paddington, whence a 3-in. lead-pipe, 2,805 yards in length, was laid into another reservoir which they found on the line of the 6-in. pipe at the spot in Piccadilly before mentioned, 3,509 yards from the conduit. The head of water in the last-named reservoir was 12 ft. above the conduit-mouth, 8 ft. below the head in the reservoir at Stratford-place, and 12 ft. below that at Paddington. In 1442 the Little Conduit by Paul's-gate, Cheapside, was built, and water laid on to it from the 6-in. pipe.

The subterranean chambers recently discovered at Stratford-place, Oxford-street, are the remains of the reservoir whence the great conduit in Cheapside was supplied with water. The spring in the underground building said to have been subsequently discovered in Oxford-street, a few yards east of North Audley-street, is no doubt one of the nine springs which formerly supplied the reservoir. The building here referred to is approached from the surface by sixteen steps, and has a cistern in the bottom, the water rising in which flows away through a pipe on each side. No doubt it was built over the spring for supplying some mansion in the locality with water long before the existing houses were erected. A precisely similar building to this, made in the reign of Henry VIII., still exists beneath the gardens of Kensington Palace. A description and representation of it may be seen in Faulkner's "History of Kensington." JOHN PHILLIPS.

FATAL FALL OF HOUSES AT WOLVERHAMPTON.

ON the 14th inst., an adjourned inquest respecting the death of a boy named Edwin Brown, who met with his death by the fall of several houses in Wolverhampton, was held before Mr. W. H. Phillips, coroner, at the Old Bush Inn, Piper's-row.

Some weeks ago several houses, which were in a dilapidated state, situate in Walsall-street, suddenly came down into the street, and the deceased, who happened to be passing along at the time, was killed on the spot.

Various witnesses having been heard, the jury, after an hour's deliberation, returned the following verdict:—

"That the deceased died from mortal injuries caused by the falling of two houses in Walsall-street on the 11th of August, which houses had been in a dangerous condition to the public from the 22nd of July last." They also added the following to their verdict:—"The jury regret that the borough surveyor is very much to blame that he did not inspect personally the property when it was reported to him that it was dangerous; and further, that Mr. Ash, as owner, and Mr. Whele, as persons who have acted as beneficial owners, should have taken no steps to have prevented the houses from falling on to the public, after receiving notice that the tenants had to leave in consequence of the great dilapidation of the premises, and notice given to each of them by their respective bricklayers that the houses were either past repairs or must come down, and the jury recommend that the borough surveyor have summary power to erect a board and to put up notices to protect the public in the event of any spot being dangerous to the public."

THE VALUATION OF GLASGOW WATERWORKS.

AT a meeting of the Glasgow Water Committee last week, the clerk stated that Mr. Dodds, the assessor of railways, canals, and other public works, had valued the local waterworks undertaking, the supply being mainly derived from Loch Katrine, at 106,655*l.* 13*s.* 5*d.*, being an increase on last year of about 25,000*l.* This increase, it was explained, arose in consequence of the assessor not allowing anything for what were called tenants' profits, Mr. Dodds having acted on the precedent established by a case decided in England in reference to the Mersey Docks. He applied the same principle to the gasworks last year, and on the case being brought before the Lord Ordinary in the Court of Session, he affirmed the valuation, and it was doubtful whether in the event of a second appeal the former decision would *not* be adhered to. It was ultimately agreed, however, to appeal against the assessment.

PROPOSED HOTEL, LEGHORN.

THE illustration shows the sea-front of a hotel about to be built at Leghorn, principally to meet the wants of English and American visitors and residents, from the designs of Mr. Walter Emden, architect. The site (on a portion of which the barracks formerly stood) is immediately outside the city walls, and is washed by the sea on three sides, the fourth facing the Corso. The views which the hotel will command are scarcely to be surpassed, and the front has an almost southerly aspect. Between the gardens indicated in the view and the sea-wall will be constructed an esplanade with jetties for yachts and boat-landings.

The extreme length of the building is 460 ft., and the widths on lines taken at right angles to the general line of front are as follow, viz.:—through projection at centre, 140 ft.; through wings at ends, 206 ft.; and through intermediate portions, 60 ft. The general height from ground to top of parapet is 90 ft., and the total height in centre 132 ft.

The ground-floor arrangement may be generalised as follows:—An arcade having a clear width of 12 ft. extends along the entire front, and returns around the wings, forming a spacious balcony at first-floor level. The central block contains, in that part projecting beyond the general line of front, outer and inner halls; ladies' and gentlemen's waiting and retiring rooms; in that part intersecting the main building a grand hall; and in the projection to rear the grand staircase with baths, and lifts from top to bottom of building.

Between the central block and the wings there are, on the left, a bar with stairs leading to music-loft, opening into *table d'hôte*, and a ladies' drawing-room; on the right general offices for clerks and inquiries; a coffee-room, and a reading-room.

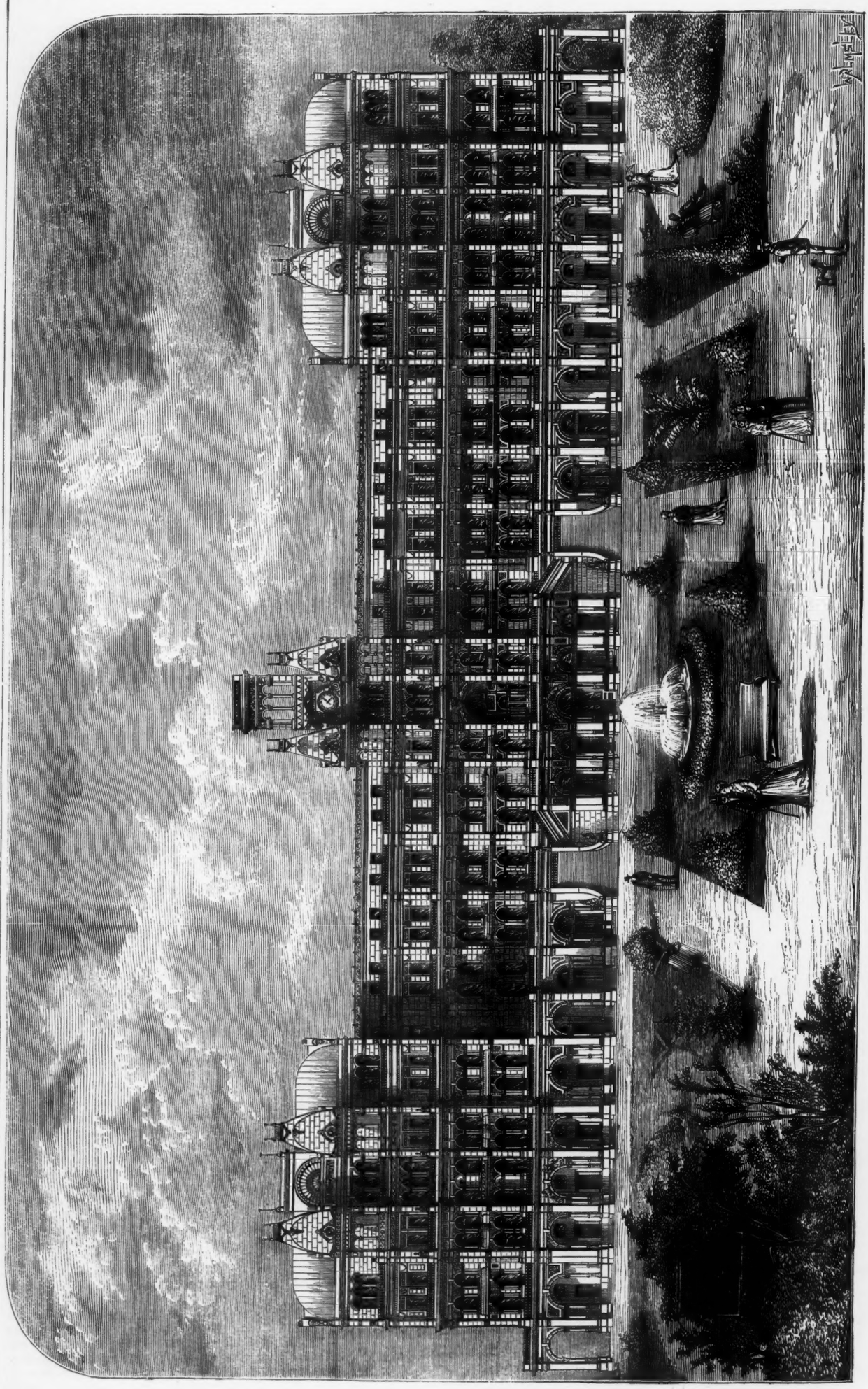
In continuation of the main building a ladies' coffee-room extends across the left, and a billiard-room across the right wing.

Forward from the line of frontage, each wing is laid out in flats, having separate staircases for approach from the outside, and so arranged that any number of the flats can be thrown into communication with or cut off from the hotel at pleasure, thus affording the choice between the hotel cuisine and attendance or complete privacy. Each flat contains all the reception and bed-rooms with kitchen and offices usually found in a moderate-sized English villa. It is proposed to construct a winter garden on the roof, as indicated by the drawing.

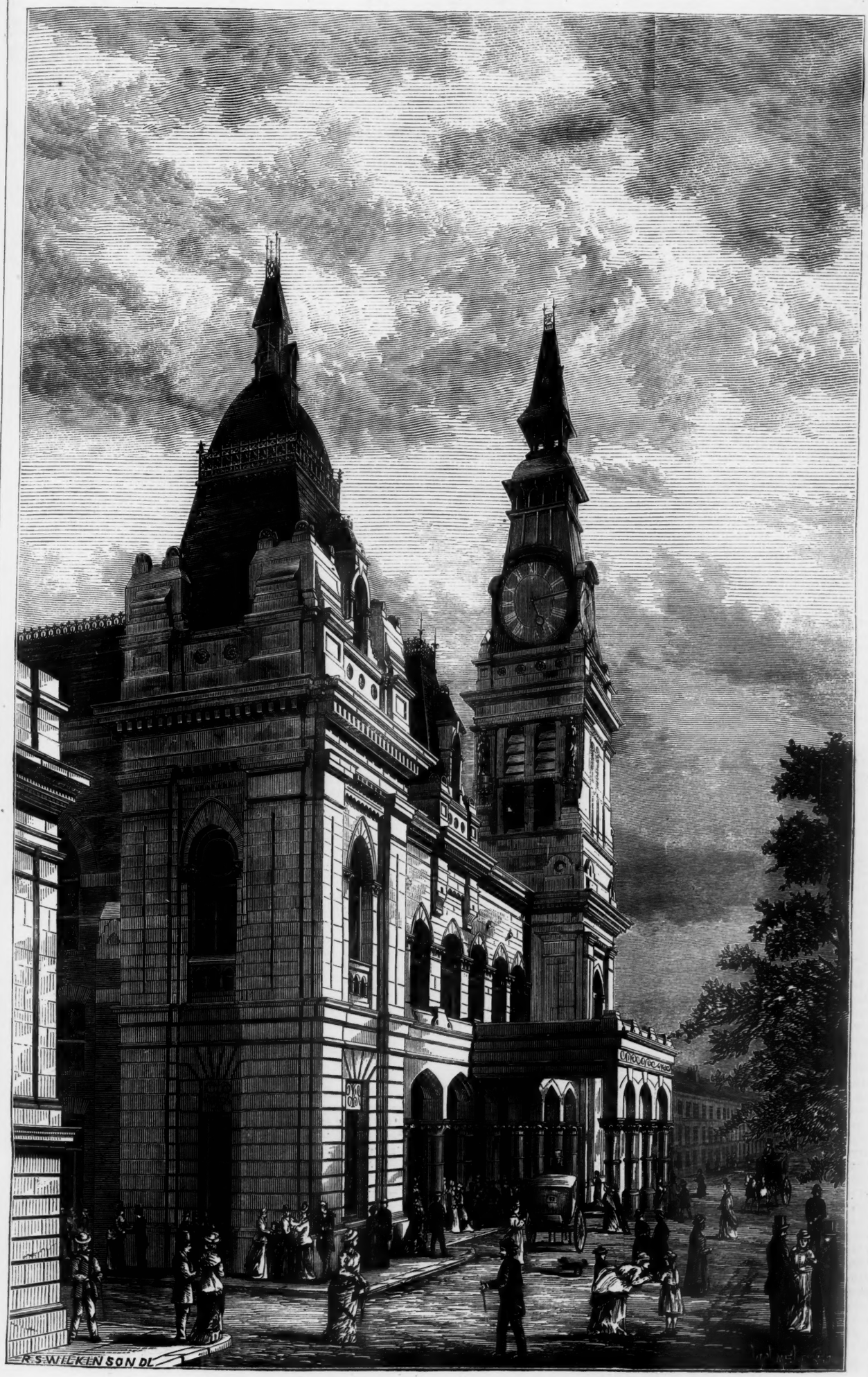
We will publish the plan of the principal floor in a following number.

THE LATE MR. ALEXANDER THOMSON, ARCHITECT.

AT a meeting of the friends of the late Mr. Alexander Thomson, architect, held in Glasgow last week, Mr. Charles Malloch in the chair, a committee was appointed to consider and report on the subject of a proposed memorial, and also to make arrangements for collecting subscriptions.



PROPOSED ENGLISH HOTEL, LEGHORN.—DESIGNED BY MR. WALTER EMDEN.



CAMBRIDGE HALL, SOUTHPORT.—MESSRS. MAXWELL & TUKE, ARCHITECTS.

CAMBRIDGE HALL, SOUTHPORT.

SOUTHPORT, the chief watering-place on the west coast of Lancashire, and the great sanatorium of the toiling millions of that and the sister counties of Yorkshire and Cheshire, is a wonderful instance of rapid mural growth, which has a parallel only in those large centres of iron industry, Middlesbrough and Barrow-in-Furness. This place, which forty years ago was a barren range of sand-banks, has been, by the force of circumstances and the courageous foresight of its master-minds, developed into one of the handsomest watering-places in England, possessing advantages which few towns of its class can boast. Its winter gardens and aquarium are unsurpassed. The pier, nearly a mile long, is provided with steam carriages, which convey visitors swiftly from end to end. The principal streets are provided with well-appointed tramway cars. The salt-water baths are handsome. Extensive botanic gardens have lately been opened. The new Hesketh Park stands as a monument of enterprise to those who six years ago knew it as a range of arid sand-hills, but which now is a beautifully laid-out and well-watered demesne. One of the pleasantest parts of the town is Lord-street, a fine broad thoroughfare, nearly two miles long, well planted and flanked with handsome buildings. It is in this street that the Cambridge Hall, the subject of our illustration, is placed. It adjoins the old Town Hall, and has been designed chiefly to supply the want of a larger public room than the old building afforded. It contains an assembly-room on the first floor, 120 ft. by 50 ft., with galleries supported from the walls by cast-iron brackets. The principal stairs are at the back, and open upon a promenade corridor, which runs the whole length of the building. The chief entrance is under a stone carriage-porch in the centre of the building. The entrance-hall, on the ground-floor, is 55 ft. by 25 ft. The roof of this is supported with columns. The floor is tiled, and on one side is a Caen stone and marble chimney-piece, with dog-grate. The space on the right of the entrance is devoted to the reception-room and the various retiring-rooms. The reception-room is temporarily used as the offices of a new local bank,—the Southport and West Lancashire Banking Company. The space to the left of the entrance is rented by the postal authorities for the postal and telegraph offices.

The building is faced with stone from the Longridge quarries.

The clock, erected by Joyce, of Whitchurch, at a cost of nearly 1,000*l.*, was the gift of Mr. W. Atkinson, of Southport.

The ground in front of the Town Hall and Cambridge Hall, amounting altogether to nearly two acres, is laid out with flower-beds and fountains as a miniature home-park, and is freely open to the public.

These works, which are only part of a larger scheme of public improvements, have been executed under the superintendence of Messrs. Maxwell & Tuke, of Bury.

NEW POST-OFFICE FOR GLASGOW.

THE inadequacy of the present building in George-square for the transaction of the increasing postal and telegraphic business of this large city has been frequently commented upon, and all concerned will be glad to learn that arrangements are now far advanced for providing the necessary accommodation. It is not proposed to interfere with the existing building until the new portion is finally completed and occupied, so as not to disturb the current business of the department. The actual new building, in the first instance, will extend from the gable of the present edifice to Frederick-street, extending to and including also the tenement recently acquired there. The business having been transferred temporarily to the new portion, the existing building will be taken down, and the improved elevation extended so as to form one uniform design. The total frontage towards George-square is 190 ft., returning downwards towards Hanover-street and Frederick-street, each 120 ft. deep, the whole covering an area of about 2,500 superficial yards. The area of the original building is only 950 square yards. With a view to secure harmony with the chief buildings surrounding the square, the Italian style has been adopted. The principal elevation is 75 ft. high, consisting of four floors above the street-level, having centre and end compartments, in each of which are the principal entrances. The one in the centre contains three arched openings, having on each intermediate pier moulded imposts and archivolt, &c., and faced with coupled relieved columns of the composite order, resting on moulded pedestals, and supporting the entablature above. The entrances on either side are of similar character, but having pilasters instead of columns. The windows in the intermediate compartments are arch-headed, and the masonry rusticated. The cornice of the entablature is carried along the entire front, ending and supporting a balustrade divided with panelled pedestals. The windows of the first floor have richly-moulded architraves and trusses supporting pediments alternately arched and pointed. The windows of the second floor are finished in a similar manner, but with moulded cornices only. The plans were prepared by Mr. Matheson, architect for her Majesty's Board of Works for Scotland.

PROPOSED NEW CEMETERIES FOR THE LIVERPOOL OUT-TOWNSHIPS.

THE necessity for providing one or more new cemeteries for several of the parishes and townships lying immediately adjacent to the parishes of Liverpool and Toxteth Park proper is now under the consideration of the local authorities of the first-named townships affected. This step has been rendered necessary in consequence of the Liverpool and Toxteth Park Burial Boards having both intimated their intention of closing their cemeteries against all who are not parishioners or residents of the two townships. The question as to whether there should be one large central cemetery for the use of the different townships in common, or a plurality of cemeteries, was freely discussed, and it was suggested that the two townships of Everton and West Derby combined, with their population of 170,000, should provide a cemetery for themselves, and that the three other townships of Kirkdale, Bootle, and Walton should provide another for their joint use. One gentleman present, Mr. Cariss, observed that cemeteries might at no distant day turn out to be unnecessary. He said he did not think it would be wise to do much in the way of providing cemetery accommodation for the future, inasmuch as there were several questions coming forward with reference to the disposal of the dead, such as cremation, and the carrying of the dead to the sea. It appeared, however, to be the general feeling of the meeting that one or more new cemeteries should be at once constructed, and that sites should be immediately procured, and a resolution was unanimously carried to the effect that it was desirable to provide burial accommodation for the several townships.

PURCHASE OF THE PLANTIN MANSION AT ANTWERP.

IT is now officially announced that the quaint old mansion in the Marché du Vendredi, that was once the printing-office and the home of the celebrated Christopher Plantin, with all its literary and typographic antiquities, has been purchased by the authorities of the city, and will for ever be maintained as a public museum. Antwerp has acquired the house and the collection for 1,200,000 francs, to which the Government has contributed 200,000 francs.

Among the antiquities of Antwerp, few are more interesting, and certainly none are less known, than this. Even the best of the guide-books pass it over without notice. In past years, when it was thrown open to the general public, some of the books, papers, and curiosities were feloniously abstracted: hence the house was shut up, and few persons were admitted to inspect it.

The house presents a remarkable appearance. Its ancient character has been thoroughly preserved. Over the door is a piece of sculpture representing the printer's arms. Behind this house, which was purchased by Plantin about 1580, and was refronted in stone by Moretus (F. J.), is a much larger edifice surrounding a spacious court-yard, in which are the museums. There are fourteen pictures by Rubens, one by Vandyck, four by Probus, two by M. de Voss. The printing-office contains about 2,000 MSS. of great value. There are also numerous manuscripts with miniatures. The library consists of 10,000 volumes, all in their original bindings, yet it is exactly a century since any addition was made to the library. The collection of engravings is inestimably valuable. There are about 10,000 on wood, and 200 on copper.

ARCHITECTS IN AMERICA.

SOME of our friends in the States are very anxious we should know what manner of man the Architect is in some parts of their country, and they send us the advertisements issued by one Mr. Appletart, let us call him. Here is part of one of the advertisements:—

"G. S. H. Appletart, Rear-end, R. M. Miller & Son's Building, 4th-street, Charlotte, N. C., architect, and agent for all kinds of iron fronts of building, galvanized cornices, iron fences, crestings, and all kinds of galvanized work, which he will sell cheaper than any person.

G. S. H. A., wishes to inform the public at large, that he is prepared to furnish plans of all kinds of buildings, with working drawings in full, which will be found much plainer than those of any other man in the State, he being a practical builder, having an experience of fifteen years in three of the largest cities of the United States. He can answer any question or give any information in regard to the construction of any part of the building, as he is fully qualified to go and do the work himself. With fifteen years as a builder and fourteen as an architect, he knows just what is necessary for a mechanic to get along with, and with this experience you will at once see that he has a pretty good knowledge of the business.

He can show as many fine buildings as any other man of his age, and will take pleasure in doing so. Any person visiting Charlotte is invited to call and examine his drawings, which he has at least 500. He guarantees to have 50 to 1 of any other person in the State. All are invited to examine them whether they are going to build or not. The ladies are specially invited."

In another paper our energetic *confrère* bursts into verse, as thus:—

"G. S. H. Appletart, Architect, Charlotte, N. C.

Come one! Come all!!
Both great and small!
To my office in rear of R. M. Miller's Hall.

It makes me feel as though I should say,
Call on me about the Centennial day,
And hear what I have to say
About buildings, on the Centennial day;
If you don't, when your building is done
You'll feel as if you wish'd you'd ne'er begun.
As for style and beauty you have none;
Call on me, as I please every one.
In style I please the eye and purse,
And guarantee to have no fuss,
And, if dissatisfied, will pay for time and trouble
Taken to investigate the truth.
Should you employ me, and I fail to please,
You can go away at your ease."

One of our correspondents from Atlanta, who encloses copies of these same advertisements, says,—"No doubt you have wondered at the manner in which architects have been appreciated in this country, but when you read the enclosed you will understand why it is that humbuggery has led the van."

Now, certainly, reading these has not conveyed to us that knowledge: those who can find any reason in these rhymes for employing the advertiser must, we think, be a very peculiar, if not very limited, class. Such vagaries in a country like America, where the profession is as yet but young, need not be looked at very seriously.

THE NEW LAW ON EMPLOYERS AND WORKMEN.

THE new Act to enlarge the powers of County Courts, in respect of disputes between employers and workmen, and to give to other courts a limited civil jurisdiction in respect of such disputes, came into operation on the 1st inst., and has application to the United Kingdom. To County Courts is now given power as to the ordering of the payment of money set off and the rescinding of contracts, and also as to the taking of security, whether the claims are liquidated or unliquidated, and are for wages, damages, or otherwise. In courts of summary jurisdiction, before magistrates, power is only given up to 10*l.*, and such proceedings are not to be deemed criminal. Such courts of summary jurisdiction have cognisance as to masters and apprentices, and an indenture is to be considered a contract between the parties. The Act is divided into five parts, and deals with the subject of security to be given to carry out any undertaking within its enactments, and empowers the Lord Chancellor to make rules. The summary jurisdiction given is expressly declared not to be deemed criminal, nor is imprisonment to be enforced, except in cases of apprentices who do not appear; nor are goods to be distrained upon which might not be taken in execution by a County Court. There is a definition of terms given and various sections as to Scotland and Ireland. The new law does not apply to domestic servants, but to labourers and others, and employers as well as workmen can be dealt with under its provisions.

The Stockton Painters have given notice that they want an advance of sixpence per day in their wages.

GENERAL FOREMEN AND CLERKS OF WORKS.

CLAIMS OF THE TRADES.

THE discussion of this subject appears to have excited an immense amount of interest amongst those concerned, if we may judge from the heap of correspondence which has reached us. It is exceedingly satisfactory that it has done so, showing, as it seems to us, a healthy desire for advancement and improvement, as opposed to the dead-level lethargy likely to be induced by some trade-union teaching. We can, moreover, with great justice, speak with praise of the good, clear style of the communications which have reached us, all of them the production of working men. We give a further selection from the letters received:—

SIR,—Having read the correspondence in reference to the "foreman" question, I was induced to look up the list of those who had passed in the honours stage of Building Construction in Science and Art Examinations, 1873 4, and I find that in 1873 fourteen individuals passed, and three of that number were either carpenters or joiners. In 1874, nineteen persons passed, five of whom were either carpenters or joiners, or more than a fourth of the whole number, and, with the exception of one builder in 1874, there is not a trade connected with building mentioned: they are either architects, draughtsmen, clerks, or teachers. I think that any further comment on this matter would be superfluous, as it clearly shows which of the building tradesmen are best qualified to lead or act in the above capacity. G. BANKS.

BRICKLAYER *v.* CARPENTER.—A CLAIM FOR THE MASON.

SIR,—Having noticed the dispute going on between the above, I have been induced to come into the field. I quite agree with "E. L." in noting the effect of the trade of the two classes upon the mind of the workman, but I think the trade which has to perform the most responsible part in the erection of our first-class buildings will be allowed by every man of unprejudiced feelings to be that of the stonemason.

I shall just notice first the qualifications required by a first-class mason (I mean the man who should be preferred as clerk of works). In commencing his trade he has to obtain a mastery over the tools in the hewing department (which is no easy task in our granite work). This gives him a most excellent opportunity for estimating the quality of stone, the material from which by far the most responsible and most expensive parts of our first-class building are constructed; and a clerk of works who is deficient in this kind of knowledge is not master of the principal part of his work, and I defy any one who has not wrought stone in some way or other to be in reality a competent judge as to its quality.

Again, the variety of shapes stones have to be cut into for the construction of the different parts of a building leads our young mason to study the art of drawing out and making the templates which he can use with practical result, and gives him an advantage which the carpenter and joiner can never attain.

Now, sir, I shall go on to the walls with my young mason, and what does he learn there? He learns to construct the part on which all the following tradesmen fix or hang their parts. He builds his hewn stones into oblique arches, arches of double curvature, groins, discharging arches, &c., and an innumerable variety of ashlar and rubble work, along with the inside dividing walls, which are not uncommonly built of bricks. Then the fireproof construction, which gives him a knowledge of iron girders, and of how to place them, and how to fill up the spaces between them with brick or concrete, as the case may be.

Now I shall go on to the duties of the foreman mason, and inquire what qualifications for clerk of works they are likely to result in. The foreman mason has to thoroughly understand the intention and construction of the entire building; he is commonly the first tradesman on the ground, and the last off when the job is finished; he requires to be most particular in his arrangements for preparing his work to receive that of all the other branches in their different places and relations, and must have a knowledge of their different constructions.

His whole and entire duties consist of brain-work,—theory and practice in combined action. After getting his working plans, &c., he has to arrange all the bond and construction of the building (the difficulty of which can be only known by a practical man), consolidate foundations if required, place his plant in proper working order, the chief part of which consists of timber, affording him an excellent opportunity of judging the quality and strength of different timbers, and the best way of placing them to resist strains, or support weight. He has also to superintend the locomotion of heavy masses of stone and iron, which, however well premeditated, requires a great amount of ready and substantial planning, owing sometimes to inaccuracy of working.

Mortars (as my friend "Bricklayer" notices) are very foreign to the carpenter, and no one will dispute that they should occupy the second place among building materials. I would say that a clerk of works ought to be well up in detecting bad mortars, and none but a practical man can thoroughly know them after they are mixed.

Your correspondent "E. L." speaks of bricklayers coming to a standstill were it not for the carpenter, and how he (the carpenter) could get on without him, and build a timber house by himself. The latter statement I do not dispute, but the former one is incorrect. No mason or bricklayer would stick for want of a centre. I do not deny they may employ a carpenter to make centreing, but it is simply because he is a worker in timber, and can make it more quickly and cheaper, not because it is difficult to plan or understand: centreing is simply tools to any of them; and who knows the tools better than the man who works them? And more, we all know that a mason, bricklayer, or carpenter can build houses independently of each other; but neither of the three houses would be anything like a perfect one.

I would take in hand to get six novices who would build timber houses, before I could get one who could build a stone or brick one.

Now, I think, I have fully proved that there is no tendency to monotony in the occupation of a mason, but that his is a trade of earnest and enlightening study from the very commencement; and I think if there be any prejudice among us, our fellow writer, "E. L.," has a fair share of it in saying that the carpenter "retains the leading position,"—a most unreasonable assertion, in the very face of the proof standing all round him. Just let him go out into the streets of our best housed towns, and examine the houses, piers, docks, bridges, and sanitary works; then let him examine our forts, lighthouses, and all buildings of durability, strength, and safety; and, last of all, let him inquire into the ruins of the once great towns and temples of the East which have withstood the destruction of armies, and the slow but eating action of time for thousands of years, and I think he will allow the mason to be the qualified man and "the" builder, and that the rest of the tradesmen (including the carpenter) are only instruments in his hands for the more complete finishing of his work.

ABERDEENSHIRE GRANITE.

SIR,—With all due deference to the remarks of your correspondent, "E. L.," in his reply to my letter upon the above subject, I beg to suggest he has failed to weaken or alter in the slightest degree the position I assumed.

He proposes to view the question from a broader basis than I had assumed for it; but he confines his views to the most narrow limits, looking at it with side glances only, devoting the greatest part of a long letter to the attempt to show that the very nature of the occupation of a carpenter and joiner exercises such a powerful educating influence upon the mind that he must in consequence become a being superior to the bricklayer, whose occupation,—albeit, the most lively and interesting when understood and properly appreciated,—he wishes you to believe exercises influences upon his mind the very opposite, reducing him to a stupid ignoramus, content to remain a mere mechanical drudge,—somewhat analogous, I suppose, to the ploughman, who simply has to follow his plough across the field that he may follow it back again.

I quite agree with "E. L." that it requires a considerable power of mind to grapple with the conception of an elaborate roof; but he cannot be ignorant of the fact that such a work is conceived and developed in the study of the architect or engineer, and it more frequently happens that the ironworker, not the carpenter, is called upon to put it into practice. Moreover, the detail is so carefully worked out that the foreman or clerk of works has no alternative but to follow the instructions, and, whatever his trade, no difficulty in detecting any departure therefrom; but I deny that the science of construction culminates in the roof. Would the most carefully constructed roof redeem the mistake of a faulty carcass, or of the foundation that should support the whole? The roof is to the carcass as the hat to the head,—it is not put on until the wearer is satisfied of the thorough completeness of the more important parts of his dress, from his boots upwards.

The remarks upon the training of the young joiner confirm my original statement, viz., that while he is passing, as he must necessarily do, all his early life in the shop, the young bricklayer from the commencement of his career is on the building, in the possession of opportunities the other must wait years to obtain.

The statement that the bricklayer's operations are limited to the aid received from the carpenter is scarcely worth comment; but, just by way of illustration, I will state that when foreman in my own branch I carried up a well-known extensive block of buildings,—one of a number of the same class,—the superstructure being constructed purely of brick and iron, even to the supports of the floors and roof, which was 80 ft. from the concrete, absorbing the labour of thirty-five bricklayers for several months, *one* carpenter sufficing to attend upon the whole, and his place could easily, under my directions, have been filled by an intelligent labourer.

"E. L." says he had some experience in both branches, and he is of opinion that the art of bricklaying is the most easily acquired. I am of a contrary opinion, founded upon the experience of forty years' continuous toil through all the grades, from an apprentice upwards; and I beg to suggest, without being offensive, that "E. L." commenced his experience with the bricklaying, and found it more difficult to attain proficiency than he is now willing to confess, and so threw it aside, choosing the more easily acquired branch,—the *carpenter;* and now, like a disappointed lover, seeks revenge by slandering the object of his former affections.

That the carpenter has greater facilities than the bricklayer for acquiring knowledge of the attendant trades, I have already disproved, by showing that the bricklayer gets a start of some years, and if he neglects his opportunities it is the fault of the man. That a carpenter can, if he choose, build a house without assistance, I quite agree; but that a bricklayer would fail, I deny: on the contrary, the bricklayer's house would possess qualities which the carpenter, in his house, would fail to produce, *i.e.*, a sure foundation, efficiently drained, free from smoky chimneys, an even temperature, and impervious to wind and rain.

Your correspondent says his letter is intended to apply to ordinary house-building. Now, ordinary houses are almost without exception built with brick; and, as a rule, they are built to *sell*,—the majority of those that build them being carpenters and joiners, who personally superintend the work; and it does not tell much in favour of them as the fittest men for the leading position, that you are frequently called upon to publish in your columns the bitter complaints of those who, in an evil hour, have been tempted to purchase one of their productions.

Touching the mason, I beg to say he has no status in this discussion, for it is very rare that stone, on account of its expense, is used other than as a veneer, commencing at the ground-line upwards. The work is like the joiner's, prepared in the shop, which is frequently at a distance from the building. The manual labour attending it is considerably more severe than the bricklayer's; the more artistic portion falls into the hands of a distinct class, the carver, who least of all has any claim to the leading position. In regard to the load of prejudice impeding the advance of the bricklayer, I used the words in my former letter advisedly, and I repeat them, for it is evident that it does exist, your correspondent contributing more than a fair share. But what is meant by the statement, that the bricklayer does not receive the education that a carpenter and joiner does? Does he wish you to believe that as boys at school their education is shaped according to the trade they are predestined to follow? How many parents of the artisan class can, when their boys are at school, determine how they shall shape their course when old enough to work; and when it is eventually decided? More by the predilections of the boy himself, or by the force of circumstances, do they not all, in respect to adult education, start equal.

Are not the adult schools open to the bricklayer the same as the carpenter? and are not the same means of self-tuition open to one as to the other? If the bricklayer does not avail himself of his advantages it is his fault. The responsibility of educating the man is vested in the man, limited only by his opportunities, his brain capacities, and, above all, his will,—not by the nature of his occupation.

That the carpenter has long held the leading position by custom, I agree, but there are precedents that are dangerous, and customs change with the times; and, I say again, "E. L." has failed to show it is his by right. I also repeat that brickwork holds the most important place in modern construction, an assertion fully borne out by the extent to which it is applied. I need not repeat that the superintendence should be intrusted to those who understand it. Admit that, and it must follow the bricklayer is the most fit, presuming he, with his superior opportunities, has made himself acquainted with the necessary practical knowledge of the other branches more immediately attendant, and in connexion with it. Therefore, I once more earnestly appeal to bricklayers to arouse themselves to a sense of their position in this respect; and whatever has happened in the past, for the future they will so far educate themselves that, by their conduct and ability, they are undeserving the too-oft-repeated slur, that a bricklayer cannot superintend his own work, much less hold the leading position. That they will do this, or, at least, make an effort, is the wish that has influenced me in the initiation of this correspondence.

A BRICKLAYER CLERK OF WORKS.

WHO LOOKS AFTER THE STRAND AND ITS TRIBUTARIES?

SIR,—A fortnight ago you were good enough to print a letter from me, inquiring whether there be any surveyor or overseer intrusted with the interests and rights of the ratepayers of St. Paul's, Covent-garden, in particular, and those of the public in general frequenting that neighbourhood. Therein I alluded to a plot of waste land at the corner of Bedford and Chandos streets, upon which a notice-board had long enjoined intending speculators to seek the aid of "a certain Mr. Howard." The result of my letter is that the notice-board in question has been removed, but the hoarding of rotten doors, worm-eaten planks, and other carpenters' refuse, still remains an eyesore and inconvenience from which even bill-stickers, unwarned, shrink with cautious dismay!

Perhaps in this dead and silly season it is inconsiderate to expect an answer to my question,—builders, architects, and other millionaires having obviously retired to their country-seats,—but unless some explanation is quickly afforded of an unusual and useless trespass upon a portion of the public footway, I shall take leave to communicate personally with the noble owner of the soil. In the present state of metropolitan government, this course is just as likely to be successful as any other. I shall inform the Duke of Bedford that certain of his Grace's agents or lessees, for at least the space of this current year, have deprived the public of a portion of the pavement in Bedford and Chandos streets, without any apparent right, and for no visible utility. At the same time an opportunity may perhaps occur to describe the character of some of the buildings which have lately sprung up upon this portion of the Duke's estate,—buildings which, under the present tenure of land in England, are contrived with such skill and cunning by both architects and builders as to afford profit to none—not even the heirs of the ground-landlord — except the architects and builders aforesaid.

Sir, I live in a new house, built to last a few years, the joint work of both an architect and a builder, to say nothing of two surveyors, who were necessarily called in to assist them. The landlord for whom the house was built knows even less about bricks and mortar than the ordinary Londoner, and he modestly admits that he cannot complain of his own house, because those of his friends are built much in the same way. Neither do I complain. Ye gods! do I not revel in my house? My windows rattle with a breath of wind, which in the winter whistles through them; in summer, the sunlight penetrates under my doors, and through their shrunk panels; my floor-boards, each inclined at a different angle, are wonderful to behold; but take them up, as I am constantly obliged to do, and you shall see something still more wonderful beneath, where the gas-pipes thread their way and leak,—oh! they leak, and always in impossible places. The chimneys, it is true, only smoke when the wind is in the east or the south-west; yet the brick walls yawn, the plaster ceilings crack, the wooden skirtings come undone; nevertheless, these are trifles compared with my staircase. O "tread"! why breakest thou? O "riser"! why so elastic? O "soffit"! why powder me with bad sulphate of lime? The devil, mayhap, has prompted an answer. The Socratic system of leaving the world, which has been much practised of late, may find in my staircase an impetus to its modern development. I believe that I am in a position to guarantee a verdict of "accidental death" to any person or persons desirous of committing suicide. By watching the right moment (and that at no distant time), any man can be successfully brained with merely one flight of my stairs. Due notice can be privately given to the mercantile and other communities of its impending fall for the benefit of the temporarily insane; and the result I am confident would accrue to the entire satisfaction of the coroner, the undertaker, and mankind.

Men of fashion being now all out of town it is too much to expect surveyors to return to London merely to inspect Bedford-street or venture along the Strand. They would avoid the latter place at any time, but most certainly at the present moment. The Strand as you know, sir, has been "up"; parts of it are still "up"; that it will be "up" again very soon is certain from the manner in which it has been put "down." I complain of nothing, much less of the state of the chronic effervescence which afflicts other thoroughfares besides the Strand. But I wish to ask a question concerning local government discipline. I am about to lay down a speaking tube between the house in which I live and the public-house opposite, for an obviously practical purpose. Can I pull up all the roadway between the two houses, dig a deep trench, and, for a week, snap my fingers at all carts, cabs, carriages, and the like? If there be any one in authority to consult concerning these things, does he ever question the necessity for digging up London as it has lately been dug up in the Strand? And if these be necessary, does he see that the stones are properly laid down again? Last Sunday morning, although no rain had fallen for days, the Strand from Wellington-street to Bedford-street was thickly coated with black congealed mud (in Continental and therefore less Christian cities the streets require to be kept quite as clean on Sundays as on weekdays); rucks of paving-stones protruded above the surface of the road, and one or two were loose and eminently dangerous; pools of black and green water lay stagnant and towards noon got lighted up by a bright sun. All this doing, redoing, and undoing, besides costing a good deal of money, leaves the streets in a state of hideous patchwork which facilitates the accumulation of refuse of all kinds—refuse, which in the Strand, more often than will be believed, depends for its removal solely upon the wheels of rolling vehicles and the extremities, naked and clothed, of passing animals both brute and human. W.

TEACHERS AND WORKERS.

(*For the Use of the School Board Schools.*)

GIVE the workman water pure,
Give the workman light and air;
If his life is insecure,
Health and mind cannot endure,
And his home becomes a snare.

Build the workman's dwelling sound,
Not an earth-house or a cave;
Scan and drain well underground,
Heed and pave well all around,
Or you'll make his living grave.

Educate the workman's child,
In your lessons aye impress
That the fountain undefiled,
Lies in truth so oft exiled,—
Mind and body cleanliness.

Teachers of the present age,
Teachers of the coming time,
If you 'd live in history's page,
Let these truths your mind engage,
They will lead to work sublime.

C. C. H.

IF ST. PAUL'S IS TO BE DECORATED.

SIR,—It is indeed lamentable to consider that after all the painstaking of the Royal Commissioners on the Fine Arts, and the careful investigations of its secretary, Sir Charles Eastlake, to determine the right method of conducting the decoration of a great public or monumental building, we should still find any one to propose, as your correspondent, "G. S. A.," that the windows should be the first consideration,—the key to the decoration of St. Paul's.

In the various reports of that Royal Commission, it was, amongst other things, distinctly pointed out that if coloured glass be introduced at all into the windows of an edifice which is destined to receive mural pictures, it should be but sparingly, in very small quantities. The first step should, therefore, be not, as your correspondent suggests, to have all the windows filled with "painted windows, richly dight," but to have those already introduced removed as quickly as possible. The next thing should be to appoint an historical painter, thoroughly conversant with the theory and practice of mural painting, to the command of the decoration of the cathedral. The introduction of those windows, from the designs of Schnorr into such a building, considering the main object in view, could have occurred nowhere but in England, and perhaps nowhere else in England but in London.

The reason for excluding painted windows under the circumstances is obvious, for pigments reflecting colours from their surfaces, no matter how skilfully treated, can never compete with the brilliancy of colours radiated from either stained or painted glass. Where windows are filled with painted glass, the glass must "lord it" over everything else in the way of pictorial art, hence its applicability to Gothic architecture, which does not admit, to any great extent, of pictorial embellishment.

The key to the decorations should be that which was the key to the architecture,—the theme of the Redemption. Here is the base on which all ecclesiastical superstructure should be raised, the theme which taxes the invention of painter, sculptor, and architect to the highest. The architect has given us the fair proportioned body, the painter and sculptor should now breathe into it the breath of life, as Michelangelo did into the Sistine, and Raffaelle into the Vatican. W. C. T.

CONCRETE PONDS.

SIR,—In the *Builder* for August 21 a correspondent asks for a remedy for the leaking of a concrete pond. As no clue is given to the nature of the subsoil, or what the concrete was made from, and how it was made and applied, it is impossible to suggest a cure; but allow me to state that I have constructed a considerable number of concrete ponds, tanks, and reservoirs, some of the former of very large dimensions, and that only in one instance has there been the slightest failure, and this I found was caused by the concrete being laid on the clay which had formed a pond that the new one was to replace. The clay contracted, through being kept dry,—a subsidence ensued, and the concrete inevitably cracked.

My method of forming the ponds is this:—After excavating the ground to the proper form, the concrete is made in the manner usual for walls of concrete buildings, with one part of Portland cement to seven parts of clean, sharp, gravel, crushed flints, or other suitable aggregate: this is laid on evenly, about 4 in. to 5 in. thick, commencing at the bottom and working towards the top. The concrete should be tolerably well beaten at the time it is deposited in place, with an ordinary turf-beater faced with sheet-iron or zinc. It is essential that a much smaller quantity of water should be employed for mixing purposes than is usual for wall building, because otherwise the cement exuding the water unnecessary for setting, the latter rises to the surface, and it is then impossible to beat the concrete as otherwise should be. In two days after completion, the surface of the concrete should have applied to it a mixture of half cement and half clean, coarse, sharp sand, a small portion only being "gauged" at a time, and this should be commenced at the lowest part as before, and well worked in with a plasterer's hand-float, so that all the interstices are completely filled; but,—and this is important,—there should be no thickness of cement or coat, but the hand-float used until it grinds against the surface of

the concrete. For cattle-ponds, the slope of the sides should be much less steep than is usual with clay ponds, because there is obviously not so good a foothold.

Allow me to say that the advantage of concrete for open ponds seems, as a rule, to have been overlooked, as with a solid substratum it will bear almost any amount of rough treatment without injury, and no protection fence is therefore necessary; neither is it liable, as clay ponds are, to sustain injury in dry seasons (when depending upon surface drainage or rainfall), and it is economical in first cost, which ranges from 1s. 6d. to 2s. 3d. per superficial yard, exclusive of the excavation. THOS. POTTER.

BACK STREETS QUESTION.

THE MIDDLESBROUGH STREETS COMMITTEE.

THE fortnightly meeting of the Middlesbrough Streets, Markets, and Building Committee was held in the Corporation Buildings on the 7th inst., Alderman Todd in the chair. The clerk having written to the Local Government Board pointing out that some members of the Town Council held that one thing was meant by the words "back passage," and some arguing that it meant another,—a back street, not a back passage,—read the following letter from the Board:—

"SIR,—I am directed by the Local Government Board to acknowledge the receipt of your letter on the 12th ult. respecting the bye-laws proposed by the Town Council of the borough of Middlesbrough, and to forward for the information of the Town Council the inclosed copy of a report which the Board have received from their architect on the subject. Having regard to the advice of their architect, the Board would not be prepared to confirm a bye-law authorising the construction of a back street of the reduced width proposed by the memorialists. But if there be any real doubt as to the meaning of the bye-law, this should be cleared up by a judicial decision, or by an amendment of the existing bye-law."

FRAS. FLETCHER, Assistant Secretary."

Copy of Enclosure.

"Middlesbrough.—Width of Back Streets.

Narrow streets seriously interfere with the free circulation of air, and the districts in which they have been formed are invariably close and unwholesome. This is mainly due to the impossibility of securing that movement in the atmosphere necessary to change the air, but also the difficulty of keeping such streets clean. Narrow streets, too, owing in some measure to the additional expense and difficulty of watching, lighting, and scavenging them, become places of deposit for every kind of filth and refuse, which, apart from considerations of the demoralisation, are very prejudicial to the health of the inhabitants. For the above reasons, and having regard to inconvenience of public traffic, I usually recommend the same minimum width for streets not intended for carriage traffic (including back streets) as is prescribed in the Towns Improvement Act, sec. 63,—viz., 20 ft.; and am of opinion that the Town Council ought never to have allowed any diminution from the minimum width of 18 ft. specified in their existing series of bye-laws, and I do not see that they have any authority whatever for doing so."

A discussion then took place as to who were responsible for persons having laid out buildings and erected houses with 3 ft. back passages, while the bye-law in existence stated that the back passages should be 18 ft. Some of the members of the committee were of opinion that the builders themselves were responsible; others thought that the Council were liable for altering them. The clerk held that the builders were responsible, because, whatever the Council did, whatever plans they passed, did not make legal an infringement of the bye-laws sanctioned by the Local Government Board. The chairman was of opinion that the committee had no right to pass block plans with less than 18 ft. back passage. At the close of the meeting a number of plans were submitted with 9 ft. back passages; but they were all refused, the only persons voting in favour of the passing of the plans being Messrs. Bargate, Archibald, and Blackburn.

THE NEW STREET, MARYLEBONE.

SIR,—It is to be hoped they will be careful about the spelling of the name of the new street from Wigmore-street to Hinde-street,—Man-devil has such a queer look. Surely Mandeville is meant? BAYSWATER.

THE WORM IN THE WOOD.

SIR,—I am much troubled by the woodwork in my cart-horse stable being worm-eaten, and should be glad to discover a preventive. The whole of the timber work, including oak stall-posts, and division boards, also flooring boards of hay-loft over, is being completely eaten away, and if touched crumbles into dust.

I am aware that eventually new timbers will be required, but in the meantime I am desirous of applying some remedy which would stop its further progress, and eradicate the pest. Possibly some of your readers might suggest the best course to be adopted. AGRICOLA.

BLAST-FURNACE CONSTRUCTION.

WITH a view to reduce the cost of a furnace stack without interfering with the permanency or the economic operation of the structure, Messrs. Weimer & Birkinbine, of Lebanon, U.S., have introduced a mode of constructing blast-furnaces which is described and illustrated in the *Bulletin* of the American Iron and Steel Association. The heavy masonry which surrounded the stacks of the furnaces of former years has given way to the lighter masonry piers, or metal columns sustaining a mantle; and now Messrs. Weimer & Birkinbine come forward with another method of construction, which consists in substituting large cast-iron housings nearly double the height of the ordinary columns or piers. The housings support a cast-iron mantle constructed in the form of a hollow girder through which air can circulate. Below this mantle the fire-brick masonry of the bosh walls (2 ft. 6 in. in thickness) is exposed, each course being confined by bands of 1 in. square iron, which are secured to the housings by T-heads resting in slots left to receive them. A casing of boiler iron surrounds the walls of the crucible as high as the tuyere openings, and between it and the walls are placed 6 in. of washed gravel, through which water is allowed to percolate. The housings also form supports for the circle-blast and water-pipes, and for a spray-pipe under the mantle. The outside of the stack above the mantle is of red brick, secured by strong iron bands provided with double clevices,—a casing of boiler iron surrounding the upper portion having flue connexions. The tunnel head is provided with Weimer's patent charger, which prevents the escape of gas when the bell is dropped and maintains a regular flow of hot-blast and boilers. The fence is adjustable so as to be used either open or closed. The entire construction is intended to consume the minimum amount of material, and the hollow mantle, spray-pipe, exposed bosh walls, light bands, and crucible casing give abundant opportunity to avoid danger from excessive temperature.

UNANNEALED GLASS.

IN a second paper on this subject addressed to the French Academy of Sciences, MM. V. de Luynes and Ch. Feil treat of blocks and plates of unannealed glass. They state that in general it is impossible to saw, file, or drill a hole in such glass without its flying off into fragments like Rupert's drops. Shape, however, exercises some influence in the matter: thus, a disk may be perforated in its centre without breaking, but if it is attempted to perforate it in any other place it will crumble to pieces. Under polarised light a square plate of St. Gobain glass displays a black cross, the branches of which are parallel to the sides. It is always possible to saw it through along those directions, but anywhere else the saw is sure to break the plate. If the two portions of the latter, when quite sawn through, be seen through polarised light, there will be perceived black stripes and coloured fringes, the arrangement of which shows that the molecular state of the fragments is no longer the same as before the operation. If the two pieces be placed directly one upon the other, the fringes and stripes disappear; but if put together inversely, the latter will assume the appearance they would have with a plate of double the thickness. This proves that all has proceeded symmetrically on both sides of the saw.

AMERICAN EDGE-TOOLS IN ENGLAND.

ENGLISH edge-tool makers in particular are (says the *Mining Journal*) aware of the success which certain of their business rivals in America have hustled them in many of our home and foreign markets. So large, however, is the demand at present for good edge-tools of almost every description that there are few edge-tool firms in the United Kingdom who have not plenty of orders upon their books. The English article is not, therefore, out of use, but there is a perceptible increase in the favour in which handy and thoroughly excellent tools are held, both at home and abroad. And this is being encouraged by the growing facilities for manufacturing steel, both shear and cast. Sensible of this, certain American firms are pushing their opportunity. Hence it comes about that American forks, shovels, and axes are to be had wherever edge-tools are offered in this country. But it would seem that the Americans believe that they can compete with us much more successfully by having branch establishments to manufacture their specialities in this country rather than by shipping their product from the other side. A firm of cast-steel shovel-makers at Pittsburgh are now, through a representative who has recently come over from Pittsburgh to England, making inquiries which will regulate their action, and determine them whether they will themselves begin to make in this country, or whether they will offer their process to English firms, or to an English company.

ARBITRATION CASES.

JACKSON *v.* BUIST.

IN October last a house in course of erection at Crockbertown, Cardiff, was taken possession of by Dr. Buist by force, the builders—Messrs. Jackson & Shaw—alleging that an amount of over 500*l.* was due to them at the time; and when the case was brought before the public, they (the builders) assigned as a reason for refusing to give up possession, the refusal by Dr. Buist and his architect (Mr. Blessley) to recognise their claims. The matter was subsequently brought before the Court of Queen's Bench, and by order of Mr. Justice Brett the whole case was referred to MR. C. E. Bernard, of Cardiff. It was further ordered that the costs of the cause were to abide the event, the costs of reference only being in the discretion of the arbitrator. The defendant, Dr. Buist, had tendered 160*l.* to the Messrs. Jackson as payment in full, which, being refused, the defendant paid 334*l.* 1s. into court, pleading a set-off of 174*l.* 1s. as liquidated damages and money paid in completing the building. The arbitrator awards that over and above the sum of 334*l.* 1s. paid into court by the defendant, the defendant is indebted to the plaintiff in the sum of 69*l.* 17s. 8d., and he directs the defendant to pay to the plaintiffs the said sum and the costs prior to the reference, and he orders that the plaintiffs and defendant do each bear their and his own costs of reference, and do each pay one-half of the costs of the award.

THE DUNDEE ESPLANADE.

THE dispute which has existed for so long a time between the magistrates and council and Mr. Hugh Kinghorn, the original contractor for the construction of the esplanade, has now been disposed of by Mr. Leslie, C.E., the arbiter.

Mr. Kinghorn left the works in an unfinished state in January, 1871, stating that he had expended all the material he was called upon by the schedule to do. In consequence of the sinking of the foundations of the wall, he stopped operations until he should receive orders from the engineer in reference to the work which still remained to be done, as the extent of the schedule measurement had been reached before he came to the pitching of the wall. The magistrate and council applied to Mr. Leslie in order that Mr. Kinghorn should be made to finish his contract, allowing him at the same time the right to reserve any claims for extras. After several hearings a considerable time ago, Mr. Leslie found that Mr. Kinghorn was bound to finish his contract, but reserved to him the right of making a claim for any extras. Mr. Kinghorn, however, declined to go on, and the magistrates resolved to finish the esplanade themselves. The works were then put into the hands of Mr. Robert Laing, contractor, Dundee, at an enhanced cost, arising from the increased price of labour and material as compared with their price when Mr. Kinghorn's contract was entered into in 1869. On the completion of the works a short time ago, the magistrates and council craved the arbiter to dispose of the contending claims. Mr. Kinghorn claimed 9,718*l.* 18s. 8d., besides damages for alleged breach of contract. The magistrates and council, on the other hand, declined to recognise his claim, and made a claim against Mr. Kinghorn for 9,591*l.* 0s. 2d., being the cost of the works which Mr. Kinghorn had left to be completed, and including the cost of repairing damages to the sea-wall while the works were left exposed by Mr. Kinghorn, and also the cost of entering into new contracts, watching, inspection, and engineer's fees upon the extra works. A long proof was taken in Edinburgh about two months ago, and parties were fully heard subsequently upon the import of the proof and the contending claims. Mr. Leslie has now decided against Mr. Kinghorn. After allowing him upwards of 1,800*l.* for extra work, he is found liable to pay to the town the sum of 6,950*l.* 19s. 6d.

Threatening a Foreman.—At the Guildhall Police Court, on the 1st inst., John Hardy, and John Ball, labourers, in the employ of Messrs. W. Lawrence & Sons, contractors, were charged with being drunk and threatening Michael Pipe, foreman at a job being carried out at the new City Club. The prisoners had been at work under him for about a fortnight, and on the following Monday they came to work drunk, which was repeated again on Tuesday, and he refused to give them their ticket. The defendants persisted in annoying him, and threatened to do for him. They were fined 5s., or seven days' imprisonment each.

COMPETITIONS.

THE School Board of Leyton and Leytonstone have selected the design, submitted in limited competition, by Mr. T. Roger Smith, for their Church-road schools. The Board obtained professional assistance in considering the plans submitted, and the report which was made to them by their adviser was very favourable to the design selected. The schools are to accommodate 525 children, in the three departments of boys, girls, and infants. The site being ample, the school-buildings will all be of one story only. A master's house will form part of the group of buildings.

GIVE THEM A RUB.

SIR,—In August, 1873, you kindly inserted my letter under the above title. Allow me now to say that it has not been unheeded in the City. The bronze statues on the Holborn Viaduct have been cleaned, and, as it appears to me, rebronzed. It seems to be rather early for such a process. It is to be hoped that arrangements are made that these statues, and all others, may be periodically rubbed or brushed, which will keep them in good order, and the example would soon be followed throughout the metropolis. Y.

DIFFERENCES.

SIR,—I have been looking in the *Builder* for the last two weeks expecting to see a statement of tenders that were sent in for building two pairs of villas in the Mall-road, Hammersmith. Not seeing them, I consider in justice to the trade they ought to be published, and having been requested by one of the competing firms, have sent you a copy of them, and shall be greatly obliged if you will print them in your next. The three middle tenders are from firms living on the spot, the lowest from a Brixton tradesman. I have no doubt all are respectable firms, but the question is, why the difference, as each firm had quantities supplied them by the surveyor, Mr. H. Lovegrove:—

Hobson	£3,439	0	0
Stimson	3,150	0	0
Chamberlain Brothers	3,047	0	0
Adamson & Sons	3,025	0	0
Wilson	2,995	0	0
Everett	2,189	0	0
Brealey	2,125	0	0

A FIFTEEN YEARS' SUBSCRIBER.

"VARNISH."

SIR,—Can any of your correspondents recommend an oak varnish that will stand out of doors? I have tried several on oak doors and window-frames, but none will stand, and therefore I suppose they are useless in preserving the wood. QUERCUS.

STOPPAGE OF A PUBLIC THOROUGHFARE.

IT is now nearly a year since the Regent's Park explosion wrecked Macclesfield-bridge, and debarred all carriage access to the fine internal road from the north and west sides of the Park for nearly a mile and a half; the *décombres* of the bridge and of the handsome gate-lodge are still prostrate in the same confusion and ruin as they were left on the 8th of October, 1874; and the inhabitants of Portland-town, Primrose-hill, the Avenue-road, and its important vicinage, are seriously incommoded and injured (in property) by this utter heedlessness. Who is blameable for this recklessness of public rights?

Allusion to the subject was made in the *Builder* some months back, but no direct movement has yet been made to compel the canal company to redress a public wrong. The sufferers have been too busy in exacting compensation for damages suffered, and the company in modifying and paying them, to repair a great and serious public grievance. Surely so great an obstruction of rights pertinent to the whole population of London can be allowed to sleep no longer. The greatest solace to the pent-up inhabitants of our great and growing metropolis is to be found in the forest glades, the opens, and the beauteous flower-walks of our parks; and although the office of ædile has been defunct for nearly 2,000 years, and that of the censor is wholly extinct, still a note from the *Builder* may attract attention to this subject, and lead to the reparation of wrongs affecting the million.

QUONDAM.

Sculpture.—An equestrian statue of Bernadotte was inaugurated at Christiana on the 7th inst. About 50,000 persons were collected in the square where it is erected. The statue, which is placed on the centre of the eminence on which the palace is built, facing the principal street, is the work of a native sculptor, Herr Bergslien, and was cast in Copenhagen.

SCHOOL BOARD SCHOOLS.

Landward (Wick).—At a meeting of the Landward School Board on the 3rd inst., the following tenders for the erection of the Thrumster school buildings were accepted, viz.:—For mason and slater work—Alexander Sutherland, Whalligoe, 764*l.* Joiner, plaster, and plumber work—Thomas Dunbar, Wick, 607*l.* 10*s.* Painter work—George Cameron, Wick, 26*l.* Total 1,427*l.*

Skenfrith.—At a meeting of the Skenfrith School Board, held on the 2nd inst. at the Town-hall, Grosmont, Mr. E. H. Lingen-Barker, of Hereford, was appointed architect to the Board. There were sixty-four applicants for the appointment.

SCHOOL-BUILDING NEWS.

Chester.—The foundation-stone of the new King's School, Chester, which will be devoted to the purposes of middle-class education, was laid on the 9th inst. by Mr. Gladstone. Mr. Blomfield is the architect, and Mr. Farrimond the contractor.

Brynmawr.—St. Mary's (National) Schools were opened on the 8th inst. The building, which is cruciform on plan, is Gothic in style, and has cost about 1,000*l.* What may be called the nave will be occupied by the boys, the girls occupying the transepts, the apse being used as a class-room for girls. The total number of children accommodated is 300. The architect is Mr. Neville, of Abergavenny; and the builder, Mr. Thomas, of Brynmawr.

Moseley.—At the usual monthly meeting of the Wednesfield School Board, on the 6th inst., Mr. Griffin, the architect to the Board, attended with plans of the new schools about to be erected at Moseley Village, which were approved, and ordered to be submitted to the Education Department.

Lochgelly.—A new school for the parish of Lochgelly is now in course of erection. The contractors are Messrs. M'Ghee & Son, and the entire cost, including the houses of the teachers, will be about 2,500*l.* The new building will accommodate 250 scholars.

CHURCH BUILDING NEWS.

Aberdeen.—At a special meeting of the Aberdeen town council on the 2nd inst., the plans prepared for the new steeple to St. Nicholas's Church, which have been exhibited for the last four months, were again discussed, but no selection was agreed on, it being resolved to remit back two of the sketches to be remodelled by the city architect.

Lincoln.—The erection of a tower to St. Mark's Church has been commenced; but the spire will not be built until the necessary funds come to hand. The work has been entrusted to Messrs. Huddlestone & Son.

Stirling.—The plans for the new church to be built in Albert-place, for the congregation of Holy Trinity Church, have been approved of, and the estimates for the work given in and opened. The contractors for the mason work are Messrs. Dougal & Ronald; for the joiner work, Mr. Robert Anderson; plaster work, Messrs. Forster & Walls; slater work, Mr. D. M'Gregor; plumber work, Messrs. Hardie. The total cost is estimated at 4,000*l.*

Hampstead.—It was announced some months ago that the trustees of the parish church of St. John, Hampstead, had consulted the parishioners as to three alternative proposals,—the enlargement and repair of the existing structure; or the demolition of it and the erection of a new church on its site; or, thirdly, the erection of a new parish church elsewhere. At a recent meeting of the trustees it was agreed that the fabric should be restored and enlarged, and that the work should be carried out under the direction and from the designs of Mr. F. P. Cockerell. A faculty to enable the alterations to be made has been obtained from the Ecclesiastical authorities, and the plans have been submitted to and approved by the Bishop of London. The present roof will be retained, so that the church will not be raised in height; but it will be lengthened to the eastward some 30 ft. or 40 ft., by the bringing forward of an apse or apsidal chancel towards the gates opening into Church-row. The west part will be left pretty much in its present condition, and small side-aisles will be added to the north and the south of the present nave, making its breadth throughout equal to the widest portion at present. The chancel will be prolonged westward into the nave, and on either side of the holy table will be a vestry—the one for the clergy, and the other for the choir. A porch will be added on the northern side facing Holly-hill. Several pinnacles with crockets will be added, and a tower and spire substituted for the present tower. The new tower and spire will rise to the height of about 150 ft., and the gilt vane and copper sheathing of the present spire will be utilised in the new structure. The total cost is roughly estimated at 10,000*l.*

Norbury.—On the 29th ult. the parish church at Norbury was reopened, after partial restoration. A sum of about 350*l.* has been expended, including a window presented by the Misses Burne, the cost of which was 150*l.* The alterations to the chancel consist of the removal of the plaster ceiling which concealed the oak roof timbers, and the opening out of these timbers, which are massive in character, moulded and carved. A five-light traceried window has been inserted at the east end, in substitution for a miserable lead light encased in brickwork, which had supplanted the original window. The plaster and whitewash, on the internal face of the ashlar walling, has been partially removed. The new window is fitted with slightly-tinted cathedral glass, by Heaton, Butler, & Bayne, of London. In the nave the plaster ceiling has also been removed, and the original massive oak timbers have been opened up, and the walls to some extent cleared of whitewash. An ancient south door, which had been built up, has also been restored. The original church consisted of nave and chancel only, but a modern brick tower at the west end has been added. The original building is of the Decorated period, and probably was erected in the time of Edward III. The alterations have been carried out under the direction of Mr. Charles Lynam, architect, of Stoke-upon-Trent, by Mr. Whittingham, of Newport, contractor.

Coventry.—The tender of Messrs. Collins & Cullis, of Tewkesbury, has been accepted for the first three sections of the work involved in the restoration of St. John's Church, Coventry. The contract, which embraces the whole of the stone work and the flooring of the church, amounts to 4,000*l.* Two other sections remain to make the restoration complete. These include the internal fittings and a new vestry. The total cost of the work, as originally designed by Sir Gilbert Scott, will be over 7,000*l.*

ROMAN CATHOLIC CHURCH BUILDING NEWS.

Westminster.—It is stated that a site in the rear of Victoria-street, and adjoining the Tothill Fields Prison, has been secured for the future cathedral of the Roman Catholic Arch-diocese of Westminster. The building will, it is said, be one-third larger than Westminster Abbey, and will be erected from the designs of Mr. Henry Clutton.

Birkenhead.—The new Roman Catholic Church of St. Lawrence, Park-street, Birkenhead, was consecrated on the 5th inst. by the Bishop of Shrewsbury. The new church has sittings for upwards of 1,000 worshippers. It was designed by Mr. O'Beyrne, architect, Liverpool; but the plans have not yet been carried out to their full extent. A chancel, 45 ft. in length, will be added at some future time, and this will make the dimensions of the building 145 ft. by 60 ft. The internal decorations are incomplete.

Harborne.—The foundation-stone of the new Roman Catholic Church of St. Mary, Harborne, was laid on the 8th inst. by Dr. Ullathorne, the Roman Catholic bishop of Birmingham. The church will be erected from designs by Messrs. Dunn & Hanson, of Newcastle-on-Tyne, the style adopted being Decorated. Sittings will be provided for 300 worshippers, and a provision will be made for a gallery at the west end should it be needed. The open-timbered roof will be formed of framed and braced rafters, the height from floor to ridge being 39 ft. Three traceried windows will light the nave, and six small lancet windows will light the aisle. Externally the building will be of red brick, with dressings of Bath stone, while the interior will be of white bricks, with bands of terra-cotta. The cost will be 5,000*l.*

Northwich.—An outlay of upwards of 300*l.* has just been incurred in decorating the Roman Catholic Church of St. Wilfrid, Northwich, and in erecting an altar and reredos. The altar, composed of white marble, was designed and executed by Messrs. Herbert & Co., of Liverpool.

The centre panel represents our Lord blessing the people, and the groups on either side contain angels in adoration. The groups on either side of the tabernacle are composed of saints. All the groups and angels which have been introduced into the canopies were designed by M. Charles Geerts, of Louvaine. The decoration of the church has been carried out by Mr. Chadwick, of Northwich.

Books Received.

Proceedings of the Association of Municipal and Sanitary Engineers and Surveyors. 1873–4. Edited by LEWIS ANGELL, C.E. London: E. & F. N. Spon. 1875.

THE first year's work of the Association of Municipal and Sanitary Engineers and Surveyors was a good one. A tolerably fair idea of it may be obtained from our pages, but the Association have done quite right in publishing their own report of the proceedings. The volume contains a large amount of valuable matter, and should be in the hands of all connected with the works of which it treats. The Association was firmly established from the very first, and perhaps owes something for that to the unhesitating assistance we gave at starting in rendering its doings widely known. More than 160 towns and districts are now represented by its members. The real secret of its success, however, is to be found in the energy, ability, and discretion exhibited by its founder, Mr. Lewis Angell, who was very properly made the first president of the Association.

Miscellanea.

Wages and the Cost of Living in Melbourne.—Mr. Anthony Trollope, in one of his letters from the Antipodes, just published, says:—Artisans in Melbourne, such as masons, bricklayers, and carpenters, now earn from 8s. to 10s. a day. Twenty years ago they were earning from 20s. to 30s. But twenty years ago everything in Melbourne was so dear that the man's condition was hardly better than it is now. The value of money wages is, however, only relative, and depends on the cost of provisions. In Melbourne, butchers' meat ranges from 3d. to 7d. per lb. In country towns it is cheaper,—say from 2d. to 5d. Bread is nearly the same as in England, the difference, if there be a difference, being in favour of the colony. Clothes, upon which protective duties are levied, are somewhat dearer in Victoria than at home. Fuel, if purchased, is dearer in the towns, coal running in Melbourne from 30s. to 35s. a ton; but the climate requires but little fire, and in the country wood is cheap. Rent in the towns is dearer than in England, but the labourer's facility of building for himself or living without rent is greater.

The Extension of the Peel Park Museum, Salford.—At a special meeting of the Salford Town Council, held on the 1st inst., Alderman M'Kerrow, in moving that Mr. Lord, the architect, be permitted to take out the quantities for the extension of the museum building, subject to his including the amount to be charged for the same in the 6,000*l.*, said that the park committee had repeatedly expressed their determination not to spend more than 6,000*l.* out of the 10,000*l.* which had been left for the purposes of the extension, and yet they had selected plans which would cost 1,000*l.* more than the amount contemplated. Mr. Lord, the architect, would receive the usual commission, but it was now proposed, in addition, that he should be allowed 2½ per cent.,—which represented from 150*l.* to 200*l.*,—for taking out the quantities. An amendment to the effect that the resolution of the museum and library committee of the 27th of July be approved, except that part which required Mr. Lord to include the amount for taking out quantities in the 6,000*l.*, be rescinded, was carried by 29 to 8.

A Portable Field Hospital.—It is stated that among the interesting sights of the Great Exhibition in Philadelphia next year, will be a field hospital, such as those used in the army of the United States. It will be built entirely of wood, and will consist of a central building and two wings; twelve field beds will be made up in the wings, which will be carefully ventilated, and furnished with all the newest sanitary appliances.

Etching on Glass.—Messrs. Malloch & Co., of Edinburgh, have produced some views, by means of a method of etching on glass which they claim the credit of inventing. The object of the invention is to provide the draughtsman with a surface which shall at once admit of the utmost freedom of hand, and receive and retain the slightest and sharpest touches of the etching point. A sheet of perfectly smooth plate-glass is covered with a preparation which, when dried, has all the appearance of a coat of yellowish oil paint, only that it possesses considerable translucency. Working on this surface much as he would do on the wax coating of the copper plate, but with the additional advantage that he can readily judge of the effect of his touches by ever and anon placing the glass against a dark background, the etcher makes his drawing. This having been completed, photo-lithography is resorted to for the purpose of reproducing it on paper. The prints which are produced by this simple process resemble impressions of etching on copper, reproducing as they do with the utmost clearness of definition every line and dot of the original drawing.

Asphaltic Fabric for Roofing. — An asphaltic fabric for roofing, invented by M. Charles Gaudefroy, fils, of Beaucamps-le-Vieux, France, is composed of a web of animal hair or flock, steeped in a bath of gas-tar, pressed between two cylinders to expel the excess of tar, then spread upon the ground and sprinkled with peat-ashes, care being taken to make them enter the web, which is allowed to dry a little, and is again steeped in a bath similar to the first, then again pressed, spread out to thoroughly dry in the air, and finally, before being rolled up it is sprinkled with fine river sand. In applying the fabric to roofing the boards usually placed upon the rafters are dispensed with, the rafters are placed about 1 ft. apart, and the fabric is at once nailed thereon. The edges of the fabric are brought close together, and the joint is covered by laths, which are afterwards coated with tar. Vegetable tar, asphalte, and analogous matters may be substituted in lieu of the gas-tar, and peat-ashes be replaced by vegetable or other ashes, earth, or an equivalent.

The Royal Infirmary for Women and Children, Waterloo-road. — Considerable additions are about to be made to this building, from plans by Mr. E. M. Barry, R.A. The works will comprise the erection of an additional story, thus increasing the accommodation by twenty-two beds. The windows will have circular heads, and the principal architectural features will be constructed so as to correspond with the old portion of the building. The new story is to be 22 ft. high, thus bringing the elevation of the entire building up to a height of 52 ft. above the street level. The materials used will be malm brick, with gauged arches, the cornice being in Portland cement, and the strings and copings in Portland stone. In addition to the new story, the basement of the building will be reconstructed in order to give increased accommodation for the out-patient department. Mr. W. Brass is the contractor, and Mr. House is acting as clerk of works. The estimated cost is 4,000*l.*

Loans in Aid of Public Works.—In the last financial year the Public Works Loan Commissioners advanced sums amounting to 2,318,759*l.* by way of loan in Great Britain. Among these loans are 1,676,154*l.* to school boards; 460,979*l.* to sanitary authorities; 83,140*l.* for harbours, docks, and piers; 46,292*l.* to local Boards and Boards of Health; 26,700*l.* under the Labouring Classes' Dwelling-houses Act of 1867; 12,794*l.* for workhouses; and 7,000*l.* to the Portpatrick Railway Company. In Ireland the Commissioners of Public Works advanced in the year sums amounting to 286,845*l.* The principal outstanding at the end of the year, the balance of advances made in Great Britain and Ireland under various Acts, after allowing for repayments made, and for sums remitted (chiefly on public works loans in Ireland), is stated in the finance accounts as amounting to 14,635,775*l.*

St. Bride's Church, Moss Side, Manchester.—The designs of Messrs. Pennington & Bridgen, of Manchester, have been selected (in a limited competition of local architects) for the new church of St. Bride, which is intended to accommodate the inhabitants of the suburbs now rapidly springing up between Chorlton and Stretford roads, and is to be erected in Talbot-street, the site having been presented by Sir Humphrey De Trafford.

Extensive New Stabling at Brighton.—An extensive range of stabling, capable of accommodating 200 horses, has just been completed in connexion with the Norfolk Hotel, Brighton. The new block is oblong in shape, with buildings on three sides. The space in the centre, which measures some 200 ft. in length by 40 ft. in width, is arched over with a roof of glass, wood, and iron, and thus forms a convenient covered enclosure, access to which is afforded by entrances from King's-road, Norfolk-street, and Silwood-street. The buildings include two floors, the upper one, on which the manager's office is also located, being utilised as dwelling-rooms for coachmen, grooms, &c. The construction of the new, together with the thorough renovation of the old, premises, was entrusted to Messrs. Spreadborough & Feldwicke, builders, of Sussex-street; the architect being Mr. W. E. Hudson.

New Town Clock at Newnham, Gloucester.—The works in connexion with the erection of a new town clock at Newnham were commenced on the 2nd inst., when Mrs. Crawshay laid the memorial stone. The clock tower will be constructed of Bath stone, and will consist of a shaft 4 ft. 6 in. square, rising to the height of 40 ft., at which level the clock, with four faces, will be fixed. Above this will be an open bell turret, with spirelet surmounted by a vane. The total height from ground to top of vane will be 60 ft. The base, which is to be 6 ft. square, built on a plinth, and capped with weather coping, will be treated in rustic courses of stone, the shaft being of ashlar work, with bands of Forest stone. The clock will be illuminated, and will strike the hours on a bell weighing 1¼ cwt. Mr. Medland is the architect, and Mr. William Fream, jun., of Gloucester, the contractor. The cost will be about 400*l.*

New Banking Premises at Dumfries.—New premises for the Union Bank of Scotland are in progress at Dumfries, from a design by Mr. Railton, architect, Kilmarnock. The façade of the building will be in the Italian style, the material used being the Locharbriggs red sandstone. The contractors are:—James Halliday, for mason work; Robert Thomson, for joiner work; Peter Drummond, for plumber work; John M'Lelland, for slater work; and John Dickson, for plaster work. Sheriff Hope on the 3rd inst. granted the prayer of the petition for interim interdict presented by the Police Commissioners of Dumfries, who seek, in the exercise of the power conferred upon them by Act of Parliament, to have the new building of the Union Bank set back to a line with the adjoining houses.

Rebuilding of the Theatre Royal, Edinburgh.—Certain obstacles which have hindered the rebuilding of the Edinburgh Theatre Royal (which was burnt to the ground in February last) have at length been overcome, and the reconstruction of the building will be commenced at once. Mr. C. J. Phipps will be the architect of the new building, and having made a survey of the ruins of the former building, he reports that the whole of the frontage, with the portico and a considerable portion of the side walls, is in good condition, and not damaged by the fire. He proposes reconstructing the theatre after the style and plan of the Gaiety in London. Accommodation will be provided for 2,300 persons. A contract for the mason work of the new building has been entered into with Messrs. M'Gregor, and it is expected that the theatre will be completed and opened in January next.

A Memorial of the Franco-German War. The monument to be raised to the memory of the French soldiers killed at Mars-la-Tour, Gravelotte, and Saint Privat is making rapid progress in the Champs Elysées, Paris. The group represents La France in an erect position, placing a crown of *immortelles* on the head of a wounded soldier, whom she is supporting in her arms. At her feet two children, seated on an anchor, are receiving in their hands the rifle which is escaping from the soldier's hands. The monument is the work of the sculptor Bogino. Its final destination is Mars-la-Tour, where it will be erected over a crypt containing the remains of French soldiers. The pedestal has been executed from a design by the architect, M. Moyaux.

New Cemetery at Nantwich.—The ground of the new cemetery at Nantwich is now being laid out, and Messrs. Madeley & Heywood, the contractors for the chapel and lodge, have commenced the erection of those buildings.

New Corporation Gas Works at Swansea. The corporation of Swansea have determined to take into their own hands the supply of gas to the inhabitants, and have now under their consideration a scheme by which they propose erecting new gas-works, at a cost of 48,000*l.*, under the superintendence of Mr. Flintoff, gas engineer. From a calculation which has been made on behalf of the corporation, it is stated that gas can be produced by them, and charged at the rate of 3*s.* per 1,000, at which sum there will be a fair profit. The price at present charged by the gas company is 3*s.* 9*d.* per 1,000. Swansea appears to be extending at a rapid rate in area and population. It is stated that, at the present time, there are no less than between 700 and 800 new houses in course of erection in the town.

New Theatre at Coatbridge.—On the 6th inst. the new Theatre-Royal and Music Hall, which has been in course of erection for nearly two years, was opened at Coatbridge. The building is seated for 2,000 people. Inside, the building is 100 ft. in length by 52 ft. in breadth, and the height from the pit floor to the ceiling is about 40 ft. The stage is 34 ft. in depth from the foot-lights to the back wall, while the proscenium opening is 26 ft. in width by 29 ft. in height. The auditorium is divided into pit, circle, and gallery,—the two latter assuming the horse-shoe shape. The seats in the circle are upholstered in crimson Utrecht velvet, and the boxes and stalls are cushioned in cloth by Messrs. Wylie & Lochead.

Mr. Joseph Moreland's Will.—The will of Mr. Joseph Moreland, formerly of Old-street, St. Luke's, but late of No. 4, Vanbrugh Park, Blackheath, who died on the 11th of July last, was proved on the 21st ult. by Mr. John Brogden Moreland, one of the sons of the deceased, the acting executor, the personal estate being sworn under 14,000*l.* According to the *City Press*, the testator bequeaths to his daughters Frances and Caroline 500*l.* each, free of duty; to his executor, 50*l.* also free; to his wife, Mrs. Frances Ann Moreland, all his household goods and furniture, and the income of the rest of his property for life; on her death the residue is to be divided between his five children.

Drainage of the Thames Valley.—At a meeting of the Richmond Select Vestry, on the the 7th inst., a letter was read from Mr. Francis Fletcher, Assistant Secretary to the Local Government Board, in which it was stated that the Board, having received an application to form a united district, with a view to the adoption of a general system of sewerage available by the sanitary authorities within the area referred to, had decided upon instituting a preliminary inquiry by one of their inspectors into the subject, and that they hoped to arrange that the inquiry, of which due notice will be given, shall be held early in October.

The Forthcoming Trade-Unions Congress.—The eighth annual Trade-Unions Congress will commence on October 11 at Glasgow. The following are some of the subjects which will be discussed:—Criminal Law Amendment Act; Master and Servant Act; Laws of Conspiracy; Trade-Unions Act; Compensation to Workmen; The Small Penalties Act; Workshops Regulation Bill, and Women working in Brickfields; Truck Act; Representation of Labour in Parliament; Appointment of Inspectors under the Factories and Workshops Act, and the Mines Regulation Acts; Arbitration in Trade Disputes; the Patent Laws; and the "Sweating System."

Defacing the Monuments in Westminster Abbey.—The other day it was discovered that a portion of the chief mast of the *Erebus*, in the recently-erected Franklin monument, had been broken off by some mischievous person. A correspondent of the *Scotsman* says:—"This is not the first monument which has been injured in the Abbey. The head of Major André, who fell during the American War of Independence, has been removed no less than three times from the marble slab erected in his honour, and no clue has ever been found to the guilty party." Every thinking man is interested in detecting scoundrels who thus act.

Winchester County Hall.—The decoration of the Winchester County Hall is progressing, under the direction of Mr. T. H. Wyatt, the architect for the restoration of the building. The paintings are by Messrs. Hardman, of Birmingham.

Archæological Discovery at Kertch.—In excavating for the foundations of a building for the Military Club at Kertch, a tomb of brick was found containing the following interesting objects:—A head ornament of gold, elaborately and artistically chased; two gold cups; a ring, in which is a gem; a gold crown, broken; several gold clasps; a gold coin, bearing the head of Alexander the Great; and a splendid gold vase, unfortunately broken, ornamented with drawings of a dark colour on a red ground, and with inscriptions in Greek. The whole bear evidence of the action of fire.

Extending Trellis-Work.—The trellis-work manufactured by Messrs. S. & C. Causley, of Kingsland-road, is the best we have seen. The very small compass it occupies when closed makes it very easy of transit, a consideration with country timber merchants dealing in these goods. Each lath is planed on both sides, thereby saving labour in painting, and also presenting a better appearance. The workmanship of the specimens submitted to us was excellent, and the extent to which a panel of it pulls out, according to the height desired, is remarkable.

A Village Convalescent Home.—The foundation-stone of a convalescent home was laid at Rownhams, Hants, on the 8th inst. The new building, which will be Gothic in character, is the gift of Lady Helena French, and will supersede some unsuitable premises which have been used for the purposes of the home during the past seven years. Mr. W. H. Coussmaker, of Shanklin, is the architect, and Messrs. Crook & Sons, Southampton, are the builders. Accommodation will be provided for six patients, a matron, and sub-matron.

Exhibition of Paintings at Manchester.—The private view of the fifty-fifth exhibition of paintings in connexion with the Manchester Royal Institution took place on the 13th inst. The works hung number nearly a thousand, chiefly consisting of oil-paintings. Messrs. Britton Rivière, J. C. Hook, G. F. Watts, M. J. Aumonier, Alma Tadema, W. H. Paton, J. D. Watson, and others, including a number of local artists, are amongst the exhibitors. The exhibition opened to the public on the 15th inst., and will remain open several weeks.

Presentation by Workmen.—On the 4th inst. the staff and *employés* of the firm of Messrs. Powis, James, Western, & Co., of the Victoria Works, Lambeth, assembled at the White Hart, College-street, Belvedere-road, for the purpose of presenting their late sub-manager, Mr. Manfred Powis Bale, with a cup and testimonial on the occasion of his leaving the firm. Mr. R. J. Dawson presided, and in presenting the cup, which was appropriately inscribed, he paid a high tribute to the character and attainments of Mr. Bale.

United Operative Bricklayers' Trade Protection Society.—The third anniversary of the Ipswich branch of this society was celebrated at the Sickle Inn on the 4th inst., when about forty members sat down to dinner. The report read by the secretary showed that the contributions during the year amounted to 80*l.*, and there had been paid for deaths 40*l.*, accidents 10*l.*, leaving a balance in hand of 30*l.* The number of members belonging to the Ipswich lodge is eighty, and that of the whole district, 7,500.

The Substructures in Oxford-street.—Some questions have been asked us as to the discovery of a second chamber, deep down in the roadway of Oxford-street, reported in the *Times* a few days ago, and said to be near North Audley-street. We are unable to obtain any information as to the find, and indeed have good authority for saying that there must be some misapprehension in the matter, the parish officials knowing nothing of any discovery beyond what we have already made known.

Scarcity of Masons in Scotland.—The *Banffshire Journal* says that in some parts of Scotland during the past summer masons have been very difficult to get on any terms. School Boards, with their heavy contracts, are monopolising all the building power in the country, and are likely to do so for the next few years.

New Drinking-Fountain for Manchester. The Baroness Burdett Coutts on the 10th inst. inaugurated a drinking-fountain which she has presented to the Corporation of Manchester. The fountain covers a space of 18 ft. by 12 ft., and is of polished Aberdeen granite.

New Limestone Quarries at Alston.—A new industry has just been added to the town of Alston by the opening out of extensive limestone quarries by the Alston Lime Company, which has been promoted and formed by Messrs. Pattinson, builders, of Newcastle. The works are situated about half a mile from the town of Alston, and are connected with the Alston branch of the North-Eastern Railway. Limekilns have been erected capable of burning sixty tons of lime per day.

Price of Land in the City.—We understand that a plot of land at the corner of Threadneedle-street and Bishopsgate-street, an area of about 3,600 ft., has been recently let at a ground rent of 2,600*l.* per annum, to receive a pile of buildings suitable for bankers, public companies, and merchants. This rent is at the rate of more than 31,000*l.* per annum per acre. Capitalised at twenty-five years' purchase, we get 775,000*l.* per acre as the value of the land.

The Bagdad Railway.—A numerous staff of engineers and surveyors, under the superintendence of Mr. W. Loftie Stoney, C.E., have left for Ismidt in order to make a preliminary *reconnaissance* of the country which the first section of the Bagdad railway, about to be constructed at the private cost of the Sultan, will traverse. The anxieties of the last few weeks have not diverted his Majesty's attention from the work which he has undertaken.

Delay as to Builders' Plans.—The great demand for new buildings in the north of England has been much retarded by the bye-laws of the rural sanitary authorities, that do not make the "authorities" determine upon the plans sent in, within a reasonable time; and the consequence of this serious delay is the setting at defiance the bye-laws by builders proceeding without first obtaining permission to build.

Dorchester Town-hall.—At the meeting of the Dorchester Town Council, on the 8th inst., a plan was submitted by the mayor, which had been gratuitously prepared by Mr. Ferrey, architect, for making an entrance to the Corporation buildings from High East-street. The design is a porch supported by two pillars on the curb of the footway, with the sides open so as not to impede passage along the footpath.

Portswood (near Southampton).—The Urban Sanitary Authority having applied to the Local Government Board for powers to borrow 17,200*l.* for sewerage works at Portswood, Mr. R. Morgan, C.E., held an inquiry on the 31st ult., at Southampton, the result of which he will report to head quarters; and upon which leave will be given, or withheld, to borrow the sum required.

Patent Office.—The offices for the registration of designs and of trade marks having been amalgamated with the Patent Office, Mr. B. Woodcroft, F.R.S., clerk to the Commissioners of Patents, has been appointed, according to the *Society of Arts' Journal*, Registrar of Designs. No formal appointment in connexion with the registration of trade marks has yet been made.

Proposed Docks for Warrington.—It is proposed to make Warrington a port, and to carry into execution some plans prepared last year by Mr. Vawser, the Borough Engineer, for extensive docks and wharfs at Bank Quay; also a scheme for a central station to supersede the two existing stations of the London and North-Western Company.

Drinking Fountain for Ripon.—On the 7th inst. a new drinking-fountain, situated on the North-road, was opened by the Mayor of Ripon. The fountain is built of stone, and has a trough for cattle. It is the gift of Mr. John Severs, of Ripon. The contractor was Mr. H. Bradford; the architect, Mr. E. H. T. Kessen; and the sculptor, Mr. T. Lambert.

TENDERS

For building residence, coach-house, and stables, on the New Farm Estate, Bromley, Kent, for Mr. W. T. Howard. Mr. W. Mundy, architect. Quantities supplied:—

	Residence.	Coach-house, &c.
J. Brown	£2,500 0 0	£626 0 0
W. Bangs & Co.	2,348 0 0	649 0 0
F. & F. J. Woods	2,251 0 0	636 0 0
Chessum	2,165 0 0	665 0 0
Payne & Balding	2,210 0 0	615 0 0
Judd & Hawkings	2,159 0 0	590 0 0
Edwards & Hames	2,197 0 0	551 0 0
W. & F. Croaker	2,160 0 0	578 0 0
Arnaud	2,098 0 0	536 0 0
Hearle & Sons	2,125 0 0	496 0 0
Stamp & Bowtle	1,989 0 0	544 0

For the erection of villa residences in Leigham-court-road, Streatham. Messrs. Edward Power & Wheeler, architects. Quantities supplied by Mr. W. Barnett.

Residence No. 1:—			
Waterson	£4,570	0	0
Rowe & Berran	4,490	0	0
Oliver	4,299	0	0
W. Downs	4,219	0	0
Brass	4,200	0	0
Ball	4,148	16	10
Shurmur	3,996	0	0
Riley & Son	3,929	0	0
Purkiss	3,900	0	0
Newman & Mann	3,885	0	0
Unwin	3,879	0	0
Dover, Son, & Co.	3,861	0	0
Hook & Oldrey	3,800	0	0
Boyce	3,754	0	0
W. Downs & Co.	3,750	0	0
Wagner	3,660	0	0
Aitchison & Walker	3,625	0	0
Residence No. 2:—			
Waterson	£4,570	0	0
Rowe & Berran	4,490	0	0
Oliver	4,299	0	0
W. Downs	4,219	0	0
Ball	4,148	16	10
Shurmur	3,996	0	0
Riley & Son	3,929	0	0
Purkiss	3,900	0	0
Newman & Mann	3,885	0	0
Unwin	3,879	0	0
Dover, Son, & Co.	3,861	0	0
Hook & Oldrey	3,800	0	0
Boyce	3,754	0	0
W. Downs & Co.	3,750	0	0
Wagner	3,660	0	0
Aitchison & Walker	3,625	0	0
Residence No. 3:—			
Water-on	£4,794	0	0
Rowe & Berran	4,741	0	0
Newman & Mann	4,560	0	0
Ball	4,525	18	10
Oliver	4,427	0	0
Downs & Co.	4,420	0	0
Shurmur	4,374	0	0
William Downs	4,347	0	0
Boyce	3,999	0	0
Hook & Oldrey	3,950	0	0
Aitchison & Walker	3,925	0	0
Unwin	3,879	0	0
Purkiss	3,840	0	0
Riley & Son	3,799	0	0
Wagner	3,770	0	0
Dover, Son, & Co.	3,759	0	0
Residence No. 4:—			
Waterson	£4,784	0	0
Rowe & Berran	4,722	0	0
Newman & Mann	4,540	0	0
Ball	4,525	18	10
Oliver	4,410	0	0
W. Downs & Co.	4,405	0	0
Shurmur	4,358	0	0
W. Downs	4,332	0	0
Boyce	3,988	0	0
Hook & Oldrey	3,950	0	0
Aitchison & Walker	3,905	0	0
Unwin	3,869	0	0
Riley	3,809	0	0
Purkiss	3,800	0	0
Wagner	3,758	0	0
Dover, Son, & Co.	3,741	0	0

For the erection of a villa residence at Knight's-hill, Norwood, for Messrs. T. B. Willoughby & Son. Messrs. Edward Power & Wheeler, architects. Quantities supplied by Mr. W. Barnett:—

Newman & Mann	£4,400	0	0
Downs & Co.	4,185	0	0
Riley	4,023	0	0
Purkiss	4,000	0	0
Dover, Son, & Co.	3,913	0	0
Unwin	3,800	0	0
Rowe & Berran	2,690	0	0
Waterson	2,485	0	0
Oliver	2,323	0	0
W. Downs	2,299	0	0
Ball	2,293	3	5
Boyce	2,214	0	0
Shurmur	2,097	0	0
Aitchison & Walker	1,995	0	0
Wagner	1,879	0	0
Hook & Oldrey	1,680	0	0

For repairs, 43, Marlborough-hill, St. John's-wood, for Mr. Theo. Uzielli. Messrs. Edward Power & Wheeler, architects:—

Butcher	£231	17	9
Chidgey	201	0	0
Lear	181	9	6
Brown	176	0	0
Hurdle	152	0	0
Soden	152	0	0
Purkiss	144	19	0
Jackson & Todd	142	0	0
Aitchison & Walker (accepted)	135	0	0

For making up, repairing, and curbing roads, Lower Norwood, for Mr. Charles Blake. Messrs. Edward Power & Wheeler, architects:—

Aitchison & Walker	£675	0	0
Killingback	663	0	0
Carter	657	0	0
Bysho	630	0	0

For widening and making up roads, Lower Norwood, for Mr. Charles Blake. Messrs. Edward Power & Wheeler, surveyors:—

Tender No. 1.			
Killingback	£239	0	0
Riley	135	11	0
Carter	133	15	0
Wallis	113	15	0
Tender No. 2.			
Killingback	363	3	8
Carter	297	17	0
Riley	255	12	6
Wallis	195	2	6

For repairs, &c., at the Duke of Hamilton public-house, Hampstead, for Messrs. Watney & Co. Mr. H. J. Newton, architect:—

Godden	£160	0	0
Tayler	152	0	0
Boden	148	0	0
Lamble (accepted)	145	0	0

For erecting new bay windows glazed with plate, stripping off old zinc gutters, and forming new lead ditto; repainting and decorating, twenty-eight houses at Battersea, for Mr. White:—

Timewell (accepted)	£1,465	0	0

For the erection of a house on the Holloway Estate, Dorking, for Mr. Frederick Taylor. Mr. F. J. Dibble, architect:—

Lynn & Dudley	£2,224	0	0
Goddard & Son	2,213	0	0
Hamblin Brothers (accepted)	2,170	0	0

For making, draining, levelling, and channelling the King's-road, Guildford, for the Urban Sanitary Authority:—

Pollard & Son	£310	0	0
Mason	307	0	0
Swayne, jun.	295	10	0
Garnett (accepted)	289	10	0

For repairs to houses in South-street, Guildford, for the Urban Sanitary Authority:—

Garnett	£133	0	0
Pierce & Clark	133	0	0
Mason	132	0	0
Pollard & Son (accepted)	109	11	0

For repairs, painting, &c., at No. 16, George-street, Mansion-house, for Mr. J. J. Stone. Mr. C. Reilly, architect. Quantities not supplied:—

Greenwood	£165	0	0
Harrison, Son, & Wood	117	6	0
Staines & Son (accepted)	98	10	0

For new sewer and road at Hampstead. Messrs. Farebrother & Clark, surveyors:—

Anderson	£2,955	0	0
Hiscock	2,795	0	0
Nowell & Robson	2,780	0	0
Killingback	2,748	0	0
Culverhouse	2,720	0	0
Watts	2,577	0	0

For the erection of East-End Juvenile Mission and Bible Schools. Mr. E. Gregg, architect. Quantities by Mr. Jas. Schofield:—

	General work.			Ventilation.		
Longmire & Burge	£15,500	0	0	£1,392	0	0
Gammon & Son	15,100	0	0	1,507	0	0
Roberts Brothers	14,689	0	0	1,413	0	0
Waldram & Co.	14,640	0	0	1,245	0	0
Ennor	14,315	0	0	1,278	0	0
Perry & Co.	14,250	0	0	1,419	0	0
J. & F. Coleman	14,113	0	0	1,397	0	0
Killby	13,863	0	0	1,383	0	0
Jacobs	13,700	0	0	1,200	0	0
Hill, Higgs, & Hill	13,680	0	0	1,300	0	0

For St. Mary's Priory, Stamford-hill. Mr. C. G. Wray, architect. Quantities by Messrs. Linsdell & Giffard:—

	Main Building.			Washhouse.		
Crabb	£2,784	0	0	£830	0	0
Robins	2,580	0	0	930	0	0
Carter	2,440	0	0	880	0	0
Bangs	2,320	0	0	790	0	0
Perry	2,247	0	0	774	0	0
Haigh	2,272	0	0	743	0	0
Newman & Mann	2,210	0	0	760	0	0
Stamp & Bowtle	2,145	0	0	817	0	0
Anley	2,180	0	0	780	0	0
Breeze	2,198	0	0	746	0	0
Waldram & Co.	2,195	0	0	749	0	0

For mortuary for the parish of St. Leonard, Shoreditch. Mr. R. Walker, architect. Quantities by Mr. W. E. Stoner:—

	Mortuary.			Fittings.			Gates.		
J. & R. Walesby	£595	10	0	£61	10	0	£40	10	0
Sawyer	579	10	0	62	0	0	44	9	0
Allen & Sons	527	0	0	62	0	0	53	0	0
Waldram & Co.	549	0	0	50	0	0	38	0	0
Brown	479	0	0	62	0	0	42	0	0

For new warehouse, Great Wild-street, W.C. Messrs. Spalding & Knight, architects. Quantities by Mr. Fleetwood:—

Burford	£2,462	0	0
Gammon & Sons	2,300	0	0
Dove Brothers	2,200	0	0
Downs & Co.	2,160	0	0
Shepherd (accepted)	1,995	0	0

For the erection of a room for religious meetings in Stockleigh-road, St. Leonard's-on-Sea. Seating not included. Messrs. Fowler & Hill, architects:—

Watts (accepted)	£694	0	0

For sewerage works, Great Amwell, Herts, for the Ware Union Sanitary Authority. Mr. T. W. Grindle, engineer. Quantities supplied:—

Barnes	£130	0	0
Dover, Son, & Co.	121	0	6
Hare	113	10	0
Allen	112	0	0
Potter	110	0	0
Hitch	109	10	0
Foard	103	9	9
Williams	100	17	11
Fisher	98	0	0
Green (accepted)	94	15	9

TO CORRESPONDENTS.

R. G. (the house under ordinary circumstances would certainly have been sold with its two *half*-party walls only. Whether the owner by the terms of the sale to R. G. has deprived himself of the power to recover for the half wall would depend on circumstances, of which we have not knowledge).—T. W. G. (please send address).—T. J., Building Act (we quite agree with the decision of the magistrate. Parts of the face of flues cannot possibly be rendered unless done during the progress of the work).—An Old Dip Trap (for "constant" service fresh arrangements are of course necessary. Whether the Water Company should insist on the use of one maker's apparatus to the prejudice of another is of course a fair question).—"The Mountebank" (next week).—C. L., Paris (compliments).—A. Z. (we are forced to decline pricing out architects' bills. The Institute scale is accessible to all).—Tradesman (if the architect or owner who gives us particulars of a building does not think it worth while to mention the tradesmen employed, we must refer to them those who complain of the omission of their names).—J. P.—A. T.—J. L.—H. S. C. T.—L.—P. & B.—P. & W.—B. & A.—B. & Son.—J. S. B.—J. D.—H. R. G.—S. M.—W. M.—C. M. B.—E. P.—H. K.—T. & Co.—P. P.—E. W.—A. P.

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